FOXCOM

Complete RF-2-Fiber Solutions

7490 Interfacility Link
Installation and User's Guide

©Copyright 2005

FOXCOM

Complete RF-2-Fiber Solutions

SATLIGHT

7490 Interfacility Link
Installation and User's Guide

Foxcom Inc.
Princeton Forrestal Village
136 Main Street, Suite 300
Princeton NJ 08540
USA
Tel: 609-514-1800
Toll Free: 1-866-ONEPATH
Fax: 609-514-1881

Foxcom Ltd.
Beck Science Center
8 Hartom Street, Har-Hotzvim
P.O. Box 45092
Jerusalem 91450
Israel
Tel: +972-2-589-9888
Fax: +972-2-589-9898
Website: www.foxcom.com
e-mail: sales@foxcom.com

This manual contains PROPRIETARY and CONFIDENTIAL information of Foxcom Inc. Reproduction, release to any third party, or any other unauthorized use, of any information contained herein is expressly prohibited

Table of Contents

1. Front Chapter 7
1.1. Warranty and Repair Policy 7
1.2. Reporting Defects 9
1.3. Certification 9
1.4. Conventions 9
1.5. Precautions 10
2. Introduction to the 7490 Interfacility Link (IFL) 11
2.1. Options 11
2.2. Product Drawings 13
2.3. Panel Descriptions 14
2.4. Block Diagrams 15
3. Installation 16
3.1. Setting up the Transmitter 17
3.2. Connecting the Fiberoptic Cable 19
3.3. Setting Up the Receiver 20
3.4. Powering the IFL 21
3.5. Connecting the Back Panel Jumpers 22
3.6. Aligning the Fiberoptic Link 25
4. Product Specifications 26
4.1. 7490 IFL Specifications 26
4.2. Model Dimensions 28
4.3. 7490 IFL Pinouts 29
4.4. 7180M Chassis Pinouts 33
5. Gain Control 37
6. Troubleshooting 38
7. Appendix 1 Cleaning Fiberoptic Connections 40
7.1. Cleaning Procedures for FC/APC Connectors 41
7.2. Cleaning Procedure for FC/APC Bulkhead Ports 42
8. Appendix II Installing a Standalone Unit 43
9. Appendix III The 2380 Relay Adaptor 44
9.1. Installing the 2380 - Parts Needed 44
9.2. Installing the 2380 - Procedure 44
9.3. 2380 Dimensions and Front Panel Label 46
9.4. 2380 Pinouts 47

10. Appendix IV 7100M Chassis 49
10.1. Equipment Safety 49
10.2. Installation 50
10.3. Model Dimensions 57
10.4. 7490 IFL Pinouts (7100M Chassis) 58
10.5. 7100M Chassis Pinouts 62
10.6. The 2300 Relay Adaptor 65
10.7. Appendix IV Changing the Primary Power Setting 70
11. Appendix V Pinouts, Detailed Information 72

List of Figures

Figure 1 - Option Label 12
Figure 2 - 7490T Transmitter Front and Rear Panel 13
Figure 3 - 7490R Receiver Front and Rear Panel 13
Figure 4 - 7490T Transmitter Block Diagram 15
Figure 5 - 7490R Receiver Block Diagram 15
Figure 6 - Typical Application of a 7490 IFL 16
Figure 7 – Connecting the 7490T to the CWDM 17
Figure 8 - 7180M Chassis Rear View 22
Figure 9 - Jumper Installation: Tx and Rx Only 23
Figure 10 - Jumper Installation: 2000 Switch in Slot 2 23
Figure 11 - Jumper Installation: 2000 Switch in Slot 5 24
Figure 12 - Jumper Installation: 2000 Switch in Slots 2 and 5 24
Figure 13 - Fiberoptic Alignment Setup 25
Figure 14 - Unit Dimensions 28
Figure 15 - 7180M Chassis Dimension 28
Figure 16 - 7490T Transmitter Pinout 30
Figure 17 - 7490R Receiver Pinout 32
Figure 18 - 7180M Chassis Rear View 33
Figure 19 - 7180M Pin Numbers 36
Figure 20 - Wiping the Connector with a Kim Wipe 41
Figure 21 - Wiping the Connector with a Kim Wipe (2) 41
Figure 22 - Cleaning the Optical Port 42

Figure 23 - Cleaning the Optical Port (2).....42
Figure 24 - Mounting the Chassis and Adaptor - Detail.....44
Figure 25 - Mounting the Pins and Adaptor.....45
Figure 26 - Mounting the Screws (1).....45
Figure 27 - Mounting the Screws (2).....45
Figure 28 - Mounted 2380.....46
Figure 29 - 2380 Dimensions.....46
Figure 30 - 2380 Front Label.....46
Figure 31 - 2380 Pin Numbers.....48
Figure 32 - 7100M Chassis Rear View.....54
Figure 33 - Jumper Installation: Tx and Rx Only.....55
Figure 34 - Jumper Installation: 2000 Switch in Slot 2.....55
Figure 35 - Jumper Installation: 2000 Switch in Slot 5.....56
Figure 36 - Jumper Installation: 2000 Switch in Slots 2 and 5.....56
Figure 37 - Unit Dimensions.....57
Figure 38 - 7100M Chassis Dimensions.....57
Figure 39 - 7490T Transmitter Pinout.....59
Figure 40 - 7490R Receiver Pinout.....61
Figure 41 - 7100M Pin Numbers.....64
Figure 42 - Mounting the Chassis and Adaptor - Detail.....65
Figure 43 - Mounting the Pins and Adaptor.....66
Figure 44 - Mounting the Screws (1).....66
Figure 45 - Mounting the Screws (2).....66
Figure 46 - Mounted 2300.....67
Figure 47 - 2300 Dimensions.....67
Figure 48 - 2300 Front Label.....67
Figure 49 - 2300 Pin Numbers.....69
Figure 50 - Fuse Drawer.....70
Figure 51 - Voltage Selector (230 Side).....70
Figure 52 - Voltage Selector (115 Side).....70
Figure 53 - Standard 7180M and 7180M with 2380 Relay Adaptor Pinout.....72
Figure 54 - 7180M with 2000 Switch Pinout.....73

Figure 55 - Pinout of 7180M Jumper with 2000 Switch in Slot 2 and 5 74
Figure 56 - Pinout of 7180M Jumper with 2000 Switch in Slot 2 74
Figure 57 - Pinout of 7180M Jumper with 2000 Switch in Slot 5 75
Figure 58 - Pinout of 7180M Jumper with Tx or Rx only 75

List of Tables

Table 1 - 7490T Transmitter LEDs 14
Table 2 - 7490R Receiver LEDs 14
Table 3 - 7490T Transmitter Pinout 29
Table 4 - 7490R Receiver Pinout 31
Table 5 - 7180M Alarm Connector (J12) Pinouts 34
Table 6 - 7180M Monitor Connector (J13) Pinout 35
Table 7 - LNB Connector (J11) Pinout 36
Table 8 - Troubleshooting 38
Table 9 - 2380 Alarms Pinout (J2) 47
Table 10 - 2380 Monitor Connector Pinout (J4) 48
Table 11 - 7490T Transmitter Pinout 58
Table 12 - 7490R Receiver Pinout 60
Table 13 - 7100M Alarm Connector (J9) Pinouts 62
Table 14 - 7100M Monitor Connector (J10) Pinout 63
Table 15 - 2300 Alarms Pinouts (J2) 68
Table 16 - 2300 Monitor Connector Pinout (J4) 69
Table 17 - AC Voltage Fuse Part Numbers 71
Table 18 - DC Voltage Fuse Part Number 71

1. Front Chapter

1.1. Warranty and Repair Policy

Foxcom performs testing and inspection to verify the quality and reliability of our products. Foxcom uses every reasonable precaution to ensure that each unit meets specifications before shipment. Customers are asked to advise their incoming inspection, assembly, and test personnel as to the precautions required in handling and testing our products. Many of these precautions are to be found in this manual.

Nullification of Warranty

The Warranty is null and void if the product casing is opened.

The products are covered by the following warranties:

A) General Warranty

Foxcom warrants to the original purchaser all standard products sold by Foxcom to be free of defects in material and workmanship for one (1) year from date of shipment from Foxcom. During the warranty period, Foxcom will repair or replace any product that Foxcom proves to be defective. This warranty does not apply to any product which has been subject to alteration, abuse, improper installation or application, accident, electrical or environmental over-stress, negligence in use, storage, transportation or handling.

B) Specific Product Warranty Instructions

All Foxcom products are warranted against defects in workmanship, materials and construction, and to no further extent. Any claim for repair or replacement of units found to be defective on incoming inspection by a customer must be made within 30 days of receipt of shipment, or within 30 days of discovery of a defect within the warranty period.

This warranty is the only warranty made by Foxcom and is in lieu of all other warranties, expressed or implied. Foxcom sales agents or representatives are not authorized to make commitments on warranty returns.

C) Returns

In the event that it is necessary to return any product against above warranty, the following procedure shall be followed:

a. Return authorization is to be received from Foxcom prior to returning any unit. Advise Foxcom of the model, serial number, and discrepancy. The unit may then be forwarded to

Foxcom, transportation prepaid. Devices returned collect or without authorization may not be accepted.

b. Prior to repair, Foxcom will advise the customer of our test results and any charges for repairing customer-caused problems or out-of-warranty conditions etc.

c. Repaired products are warranted for the balance of the original warranty period, or at least 90 days from date of shipment.

D) Limitations of Liabilities

Foxcom's liability on any claim, of any kind, including negligence for any loss or damage arising from, connected with, or resulting from the purchase order, contract, quotation, or from the performance or breach thereof, or from the design, manufacture, sale, delivery, installation, inspection, operation or use of any equipment covered by or furnished under this contact, shall in no case exceed the purchase price of the device which gives rise to the claim.

EXCEPT AS EXPRESSLY PROVIDED HEREIN, FOXCOM MAKES NO WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO ANY GOODS, PARTS AND SERVICES PROVIDED IN CONNECTION WITH THIS AGREEMENT INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. FOXCOM SHALL NOT BE LIABLE FOR ANY OTHER DAMAGE INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH FURNISHING OF GOODS, PARTS AND SERVICE HEREUNDER, OR THE PERFORMANCE, USE OF, OR INABILITY TO USE THE GOODS, PARTS AND SERVICE.
The Company's exclusive warranty and the remedy provided for breach thereof shall not apply to (a) any Product used or operated other than pursuant to the Company's written instructions, (b) damage or deficiencies resulting from accident, alteration, modification, misuse, tampering, negligence, improper maintenance, installation or abuse, (c) use of any Product other than at the Installation Site, (d) use of any Product that is defective or damaged due to misuse, accident, or neglect, or due to external electrical stress, lightning or other acts of nature, (e) use of any Product by a person who is not any authorized employee of the Customer, or (f) used other than as explicitly authorized in writing by the Company.

1.2. Reporting Defects

The units were inspected before shipment and found to be free of mechanical and electrical defects.
Examine the units for any damage which may have been caused in transit. If damage is discovered, file a claim with the freight carrier immediately.
Notify Foxcom as soon as possible.
Refer to Warranty and Repair Policy for further details.

Note

Keep all packing material until you have completed the inspection.

1.3. Certification

The 7490 IFL has CE, FCC, FDA, and UL certification.

1.4. Conventions

In this manual the following special formats are used:

Note

Notes contain information detailing the current topic.

CAUTION

Cautions contain information regarding situations or materials which could damage your product.

WARNING

WARNINGS CONTAIN INFORMATION REGARDING DANGEROUS FUNCTIONS.

1.5. Precautions

1.5.1. Personal Safety

WARNING

OPTICAL RADIATION

APPLYING POWER TO THE TRANSMITTER UNIT WILL CREATE A LASER ENERGY SOURCE OPERATING IN CLASS I AS DEFINED BY IEC 825-1. USE AN INFRARED VIEWER, OPTICAL POWER METER OR FLUORESCENT SCREEN FOR OPTICAL OUTPUT VERIFICATION.

AC POWER HAZARD

THE RACKMOUNT POWER SUPPLY LINE IS EMI FILTERED. THE CHASSIS IS CONNECTED TO EARTH GROUND IN COMPLIANCE WITH SAFETY REQUIREMENTS. ALWAYS USE THE 3 PRONG AC PLUG WITH EARTH GROUND TO AVOID POSSIBILITY OF ELECTRICAL SHOCK HAZARD TO PERSONNEL.

1.5.2. Equipment Safety

To avoid damaging your product, please observe the following:

1. Fuses: The 7180M does not have fuses. If the unit fails, pull the power supply out from the chassis and then push it back in.
2. The input of the transmitter has an optional built-in bias for inserting DC power up the coax to the LNB. Make certain any equipment or test equipment connected to the transmitter input can withstand this bias.
3. The output of the receiver is AC coupled and can withstand the bias from a satellite receiver. ***Do not exceed 25V DC bias.***
4. Do not allow any dirt or foreign material to get into the optical connector bulkheads. This may cause damage to the polished optical connector end faces.
5. The optical fiber jumper cable bend radius is 3 cm. Smaller radii can cause excessive optical loss and/or fiber breakage.
6. If multiple transmitters are installed in the chassis allow sufficient room for adequate ventilation; otherwise the units may overheat causing possible safety hazard or equipment damage.
7. When several units are installed on one 7180M chassis, ensure that the total current consumption (including any LNB bias) does not exceed 6A per chassis.

2. Introduction to the 7490 Interfacility Link (IFL)

The Sat-Light™ 7490 IFL transmits an L-Band RF signal over singlemode fiber from a satellite antenna LNB to control room equipment providing up to 28 dB of optical budget. This translates into a transmission distance of 65 kilometers as well as applications requiring multiple optical frequencies using Coarse Wavelength-Division Multiplexer (CWDM) technology. The 7490 IFL consists of an optical transmitter (7490T) which receives the L-Band signal from the LNB and an optical receiver (7490R) which connects to a satellite receiver. The 7490T transmits signals using ITU standards wavelengths to the CWDM. Each wavelength is transmitted on a separate single mode fiberoptic cable and then multiplexed onto a single fiber. The 7490R receives the single and has additional gain stages to offer greater transmission distance. The 7490 IFL's high optical budget provides the power for any system.

The 7490T and 7490R modules plug into the 7180M[1], a 3U chassis/power supply, which enables expansion of the system to accommodate up to 8 Sat-Light modules. Accessories include the Model 7001P Power Supply, the Model 2000 1:1 Redundant Switch, the Model 2100 Amplifier, the 2380 Relay Adaptor, the Model 7050 Serial Optical Multiplexer, an asynchronous data link, and 3000M/3000E CWDM Multiplexer and De-Multiplexer.

The 7490 IFL transmits all satellite modulation schemes - digital or analog. Any FM modulated RF signal is transmitted accurately. The RF signal is directly modulated and adds virtually no phase noise to the original signal. The direct modulation, coupled with the 7490 Links RF circuitry, guarantees superior signal quality. Featuring a Multi-Quantum Well (MQW) laser diode, the 7490 IFL operates over a wide temperature range, without needing to be cooled. Slow start optical power control protects the laser from DC transients upon turn-on.

Gain Control provides for optimization of the RF signal. LEDs, and back panel monitors and alarms allow for complete system status monitoring and interfacing with monitor and control (M&C) systems.

2.1. Options

The 7490 IFL comes with a variety of options:

1. Extended frequency; 950 to 3000 MHz; the standard bandwidth is 950 - 2150 MHz.

2. LNB powering; the transmitter unit can provide 14 VDC for optional LNB powering.

[1] 7000M in older models; refer to Appendix IV 7100M Chassis.

3. 50 Ω Input/Output Impedance/BNC female connector or a 50 Ω Input/Output Impedance/SMA female connector ; Standard impedance is 75 Ω/F type, female connectors.

4. Standalone unit; the 7490 IFL can be installed as a standalone unit. If the 7490 is used as a standalone, a separate power supply must be used.

On the side of the 7490T and the 7490R units is a label which lists options 1 to 3. Under each option is a square[2]. If the unit includes a particular option the square under the option should be marked

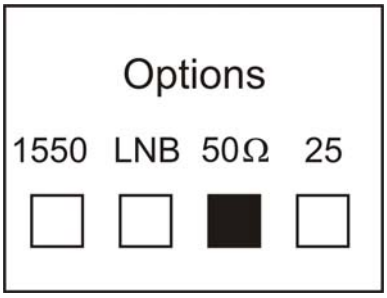


Figure 1 - Option Label

[2] There are some options on the label which are not relevant to the 7490 IFL.

2.2. Product Drawings

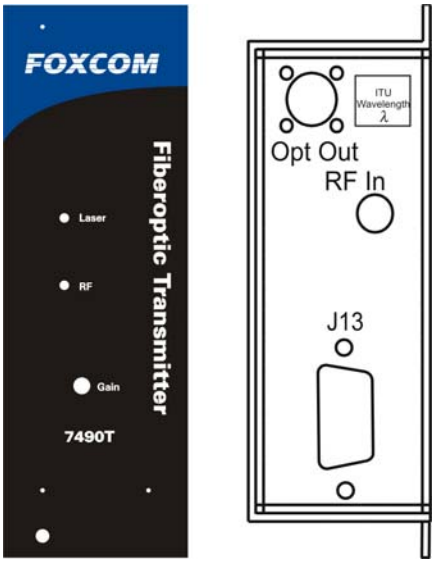


Figure 2 - 7490T Transmitter Front and Rear Panel

Figure 3 - 7490R Receiver Front and Rear Panel

2.3. Panel Descriptions

On the Front Panel of the 7490 IFL units are LEDs. All LEDs should be on when the units are in use. The following tables describe the LEDs.

Table 1 - 7490T Transmitter LEDs

LED Name	LED Function
Laser	Indicates if the laser is functioning
RF	Indicates if the RF signal is within operating limits (-40 to -20 dBm)

Table 2 - 7490R Receiver LEDs

LED Name	LED Function
Opt.	Indicates if the optical input power is above the minimal level (≥ -23 dBm)

2.4. Block Diagrams

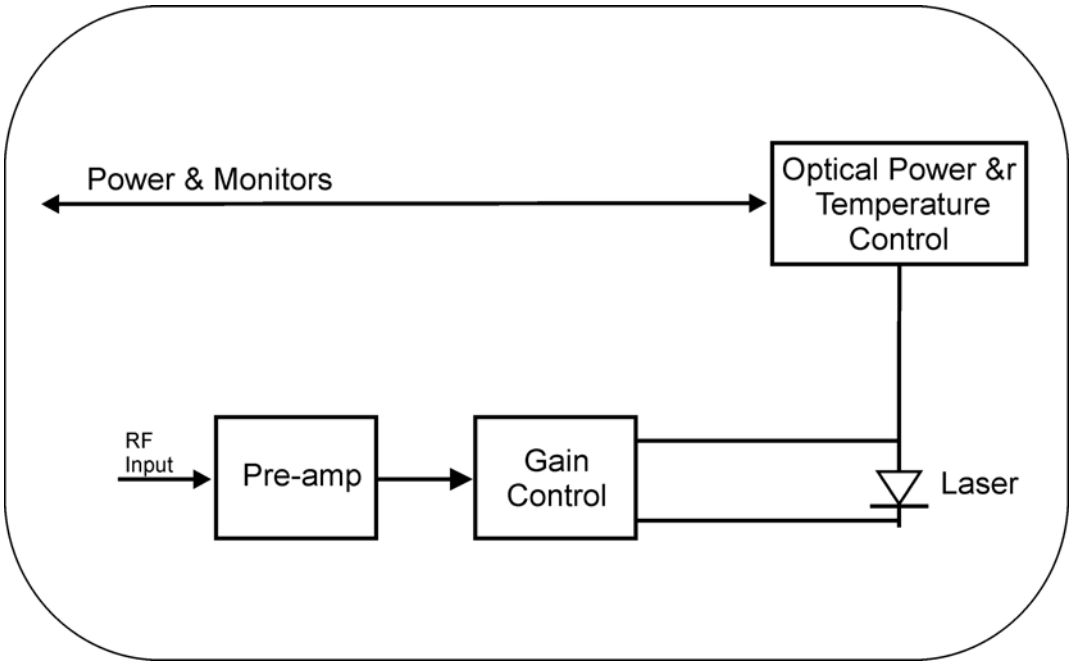


Figure 4 - 7490T Transmitter Block Diagram

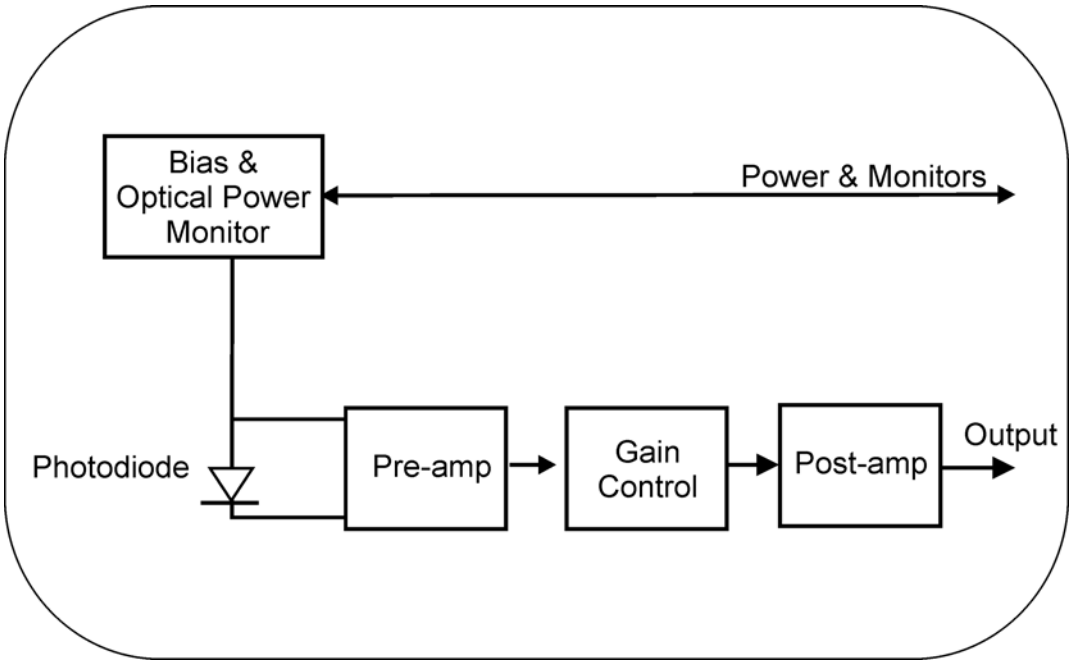


Figure 5 - 7490R Receiver Block Diagram

3. Installation

The following section details how to install the 7490 IFL units[3].

Setting up the 7490 IFL Transmitter/Receiver consists of the following steps:

1. Setting up the transmitter
2. Connecting the fiberoptic cable
3. Setting up the receiver
4. Powering the IFL
5. Connecting the back panel jumpers
6. Aligning the fiberoptic link

Observe all warnings and cautions mentioned at the beginning of this manual (page 10). If after set-up you experience problems, refer to Troubleshooting on page 38.

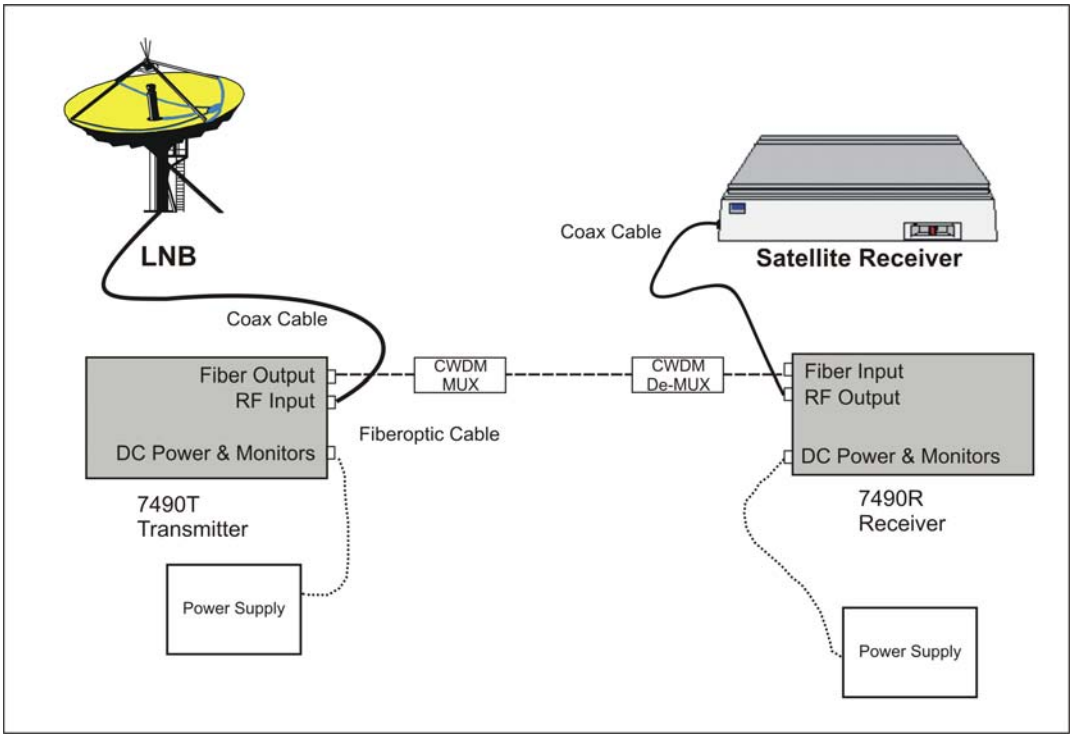


Figure 6 - Typical Application of a 7490 IFL

[3] This section gives instructions on installing the transmitter and receiver in a chassis rackmount. For instructions on installing standalone units refer to Appendix II Installing a Standalone Unit.

3.1. Setting up the Transmitter

1. Place the 7490T in the 7180M Chassis. The operating base plate temperature must be between -10° C to 55° C.

2. Apply AC power to the chassis. The Laser LED should be lit.

3. Using an optical power meter, measure the optical power. Insert the meter's cable into the Transmitter's optical connector. Power levels should be between 2 - 5 mW (+3 to +7 dBm).

Alternatively, use a DVM to measure the voltage at:

- pins J13-P17 through J13-P24 for the slot being measured (Refer to Table 6 on page 35 for details regarding J13 pinouts) (7180M Rackmount)
- at pin #6 of the 9 pin connector (standalone)

The signal level should be -4.2 to -4.8VDC.

4. On the rear panel, connect the coax cable to the RF Input Connector. The RF LED should be lit.

5. On the rear panel, connect the fiberoptic cable to the Optical Connector.

6. Connect the fiber optic cable to the corresponding CWDM input connector.

CAUTION

Each Transmitter must be connected to the proper CWDM connector.

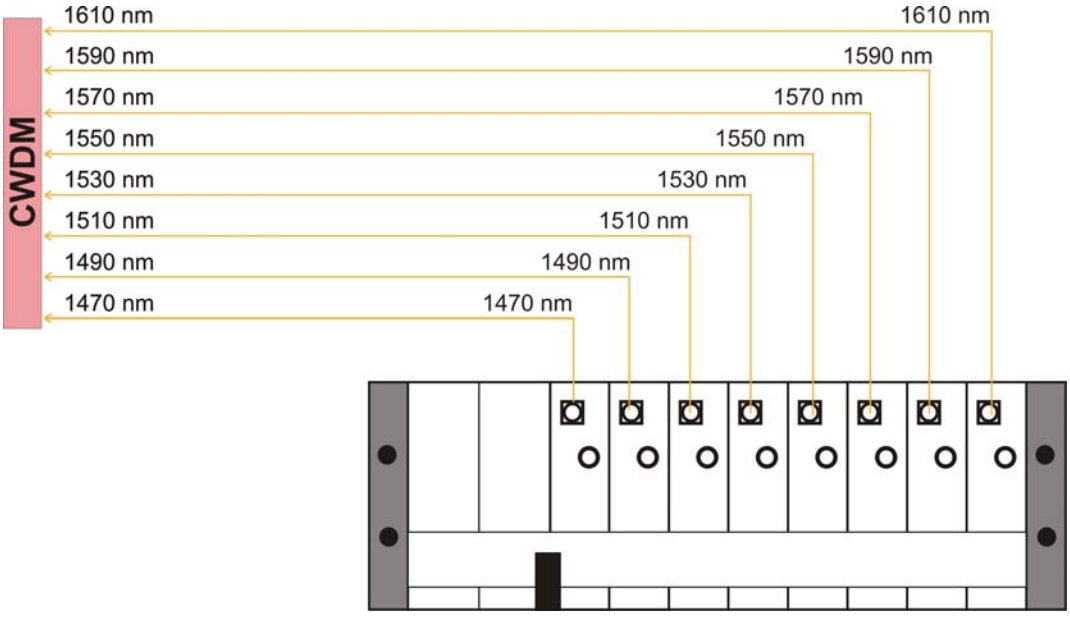


Figure 7 – Connecting the 7490T to the CWDM

7. Adjust the Gain Control Potentiometer to give the desired output power. Using a small screw driver, turn the potentiometer (located on the front panel) to increase or decrease the gain.

- To ***increase*** the gain, turn the gain control clockwise.
- To ***decrease*** the gain, turn the gain control counterclockwise.
- For more information refer to Aligning the Fiberoptic Link on page 25.

Note

If either LED is not lit, refer to Troubleshooting, page 38.

Note

The potentiometer is 10 turn potentiometer.

CAUTION

When monitoring the voltage outputs use only a high resistance DVM.

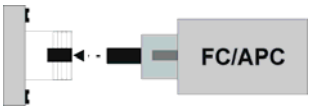
3.2. Connecting the Fiberoptic Cable

Before connecting the cable:

1. The fiberoptic cable ***must*** be either fusion spliced or connected via FC/APC connectors.
2. Wipe the connector with a lint-free cotton cloth.
3. Note the polarity key of the optical connector before inserting.

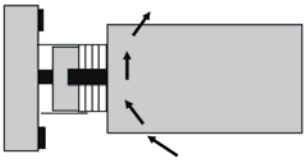
To connect the cable:

1. Line Up the Polarity Key.



2. Insert the connector.

3. Tighten the connector.



CAUTION

Do not apply any glue, silicon adhesive, or any other material to the fiberoptic connector!

3.3. Setting Up the Receiver

1. Place the 7490R Receiver in any of the 7180M Chassis, unless a 2000 RF Switch is installed (refer to Figure 8, page 22). The operating base plate temperature must be between -10° C to 55° C.

Note

If a 2000 RF Switch(s) is being installed, then slots 2 and/or 5 of the 7180M are reserved for the switch(es).

2. Apply AC power to the chassis. The Power Supply's LED should be lit.

3. On the rear panel connect the fiberoptic cable from the De-Mux to the Optical Connector. The Opt. LED should be lit (if the Transmitter is operating correctly). Repeat for each receiver.

4. Using an optical power meter, measure the optical power coming to the Receiver from the fiberoptic cable. The power levels of the Receiver should be the power level measured at the Transmitter minus the fiber loss[4].

Alternatively, use a DVM to measure the voltage at:

- pins J13-P9 through J13-P16 for the slot being measured (Refer to Table 6, page 35 for details regarding J13 pinouts) (7180M Rackmount). The voltage loss should more than 0.06V.
- at pin #5 of the 9 pin connector (standalone)

5. On the rear panel, connect the coax cable to the RF Output Connector.

6. Adjust the Gain Control Potentiometer to give the desired output power. Using a small screw driver, turn the potentiometer (located on the front panel) to increase or decrease the gain.

Note

The potentiometer is 10 turn potentiometer.

- To ***increase*** the gain, turn the gain control clockwise.
- To ***decrease*** the gain, turn the gain control counterclockwise.

For more information refer to Aligning the Fiberoptic Link on page 25.

Note

If the LED is not lit, refer to Troubleshooting on page 38.

[4] Fiber loss is defined as:
(attenuation/km x length (km) of the fiberoptic cable) + (1.0 dB x number of connectors).
For example if a signal with an optical wavelength of 1310 nm is transmitted over a link 10 kilometers long which had two connectors the loss would be:
(0.4 dB/km x 10 km) + (0.5 dB x 2) = 5.0 dB

3.3.1. Measuring the RF Signal Strength

The RF signal strength can be monitored during operation via a DC RF signal-strength monitor. Maintenance personnel can perform a simple verification process.

To measure the RF signal strength:

- **Rackmount Connector:** Using a Digital Volt Meter, measure the voltage at J13P1 to P8.
- **2380/2300 Relay Adapter:** Using a Digital Volt Meter, measure the voltage at J4P1 to P8.
- **Standalone:** Using a Digital Volt Meter, measure the voltage at the connector pin #4.

The nominal level is 3 to 4 VDC.

3.4. Powering the IFL

- Transmitter power requirement: 15VDC @ 350mA (excluding LNB Drive option).
- Receiver power requirement: 15VDC @ 360mA.
- The Standalone Transmitter/Receiver is powered by a Foxcom-supplied external DC power supply.
- The Rackmount Transmitters/Receivers are plugged into the rackmount chassis. The chassis can accept and power up to eight units.

Note

At temperatures below -10° C, the Transmitter's internal heater will require an additional 120 mA. The Transmitter's total power requirement will then be 470 mA.

CAUTION

Ensure that there is a good airflow around the chassis rackmount.

3.4.1. 7180M Chassis

The 7180M Chassis provides power to the plug in units. The power supply is a switching type. Each plug-in regulates its own voltage. The power supply provides:

- 14 VDC stable
- AC input; 100 - 240 VAC
- Units can be plugged in "hot standby"

.

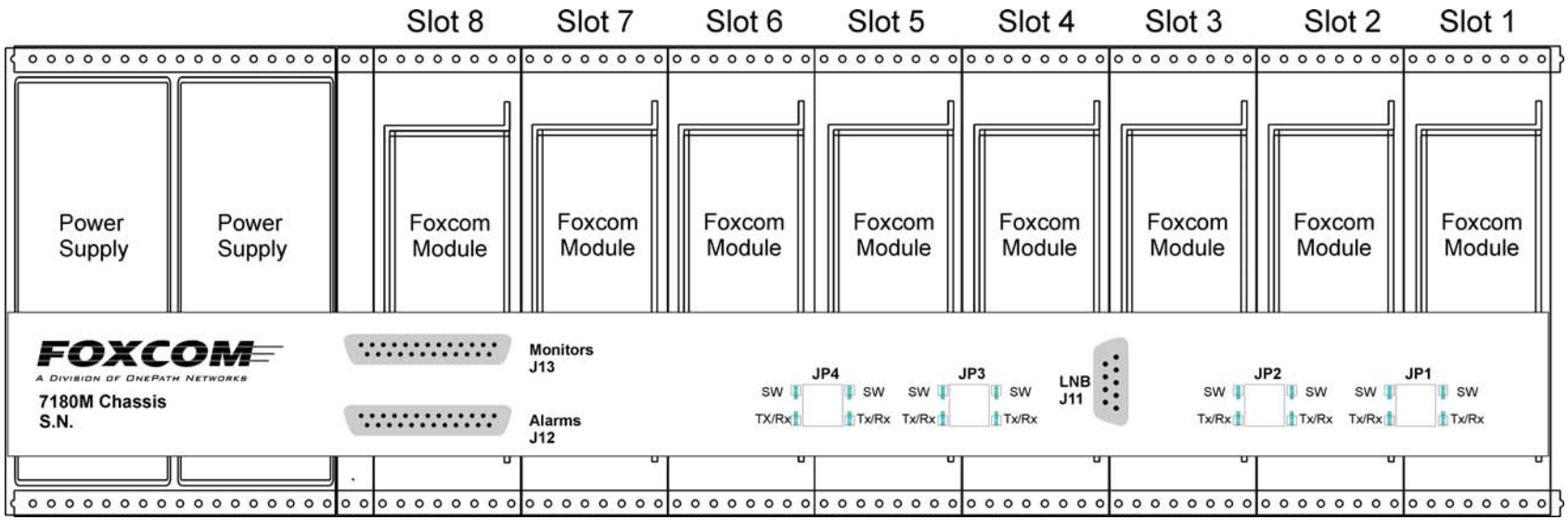


Figure 8 - 7180M Chassis Rear View

3.5. Connecting the Back Panel Jumpers

On the rear panel of the 7180M Back Panel are product selectors (JP1 to JP4). The 3 pin selectors (male) are the connecting point between the slots and the back panel. One pin is for the transmitter/receiver (Tx/Rx), one is for the optional 2000 1:1 Redundant Switch, and one is for the 7180M. A 2 pin jumper (female) is placed on the relevant pins to complete the connection between the 7180M and the units. For example, if a 2000 Switch is being used, the jumper is placed on the Switch-7180M pins.

To connect the jumpers:

1. Each jumper has two sets of pins, upper and lower. The upper pins are labeled SW (Switch) and the lower pins Tx/Rx.

2. If the 7180M has Tx or Rx units only, place all jumpers on the lower two pins.

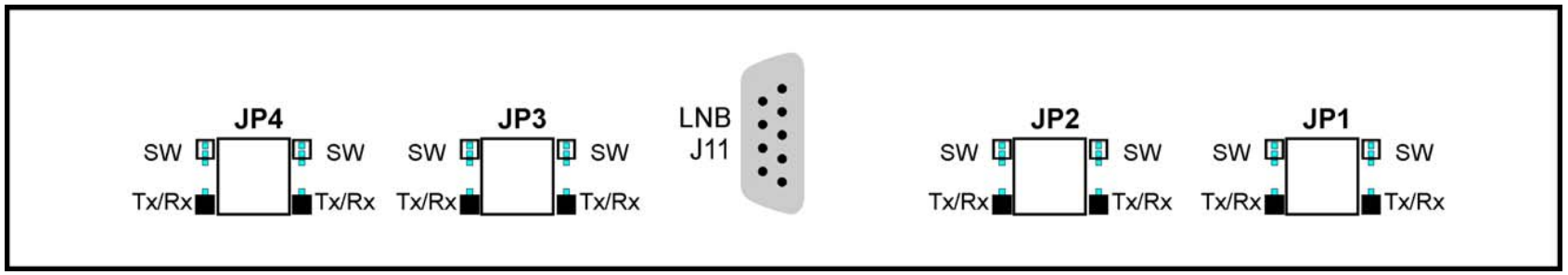


Figure 9 - Jumper Installation: Tx and Rx Only

3. If the 2000 Switch is installed in Slot 2, place the JP1 and JP2 jumpers on the higher two pins and the JP3 and JP4 jumpers on the lower two pins.

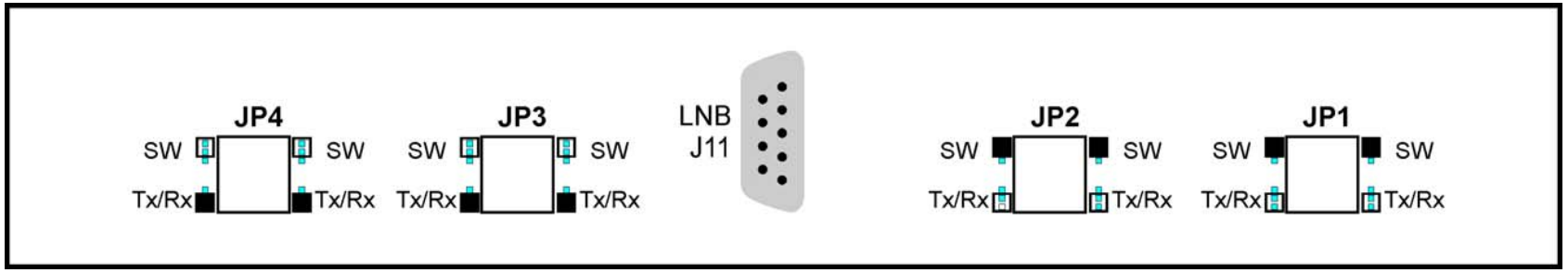


Figure 10 - Jumper Installation: 2000 Switch in Slot 2

4. If the 2000 Switch is installed in Slot 5, place the JP1 and JP2 jumpers on the lower two pins and the JP3 and JP4 jumpers on the higher two pins.

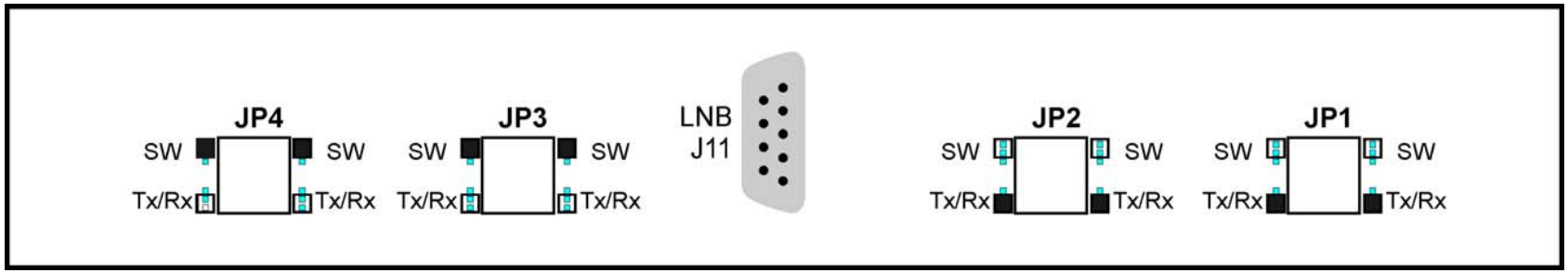


Figure 11 - Jumper Installation: 2000 Switch in Slot 5

5. If the 2000 Switch is installed in Slots 2 and 5, place the JP1, JP2, JP3, and JP4 jumpers on the higher two pins.

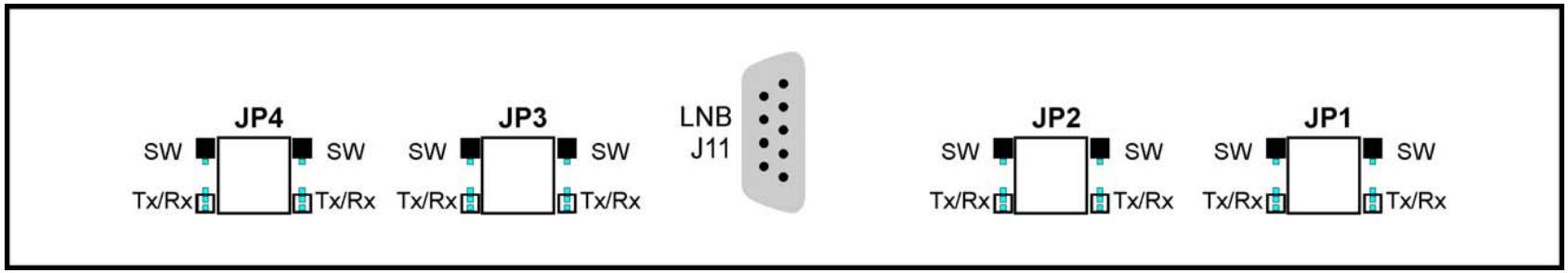


Figure 12 - Jumper Installation: 2000 Switch in Slots 2 and 5

3.6. Aligning the Fiberoptic Link

The final step in installing the 7490 IFL is re-adjusting the Receiver Gain Control for unity gain.

To set the unity gain (standard version)[5]:

1. Connect combiner output to input of Spectrum Analyzer (S.A.).
2. Set Signal Generator 1 to -23 dBm on the S.A. at 2000 MHz.
3. Repeat for S.G.2, at 2010 MHz.
4. Set up the system as shown in Figure 13.
5. Set the Transmitter Gain Control for 3rd order intermodulation level of -40 dBc at the Receiver output.
6. Adjust the Receiver Gain Control for unity gain.

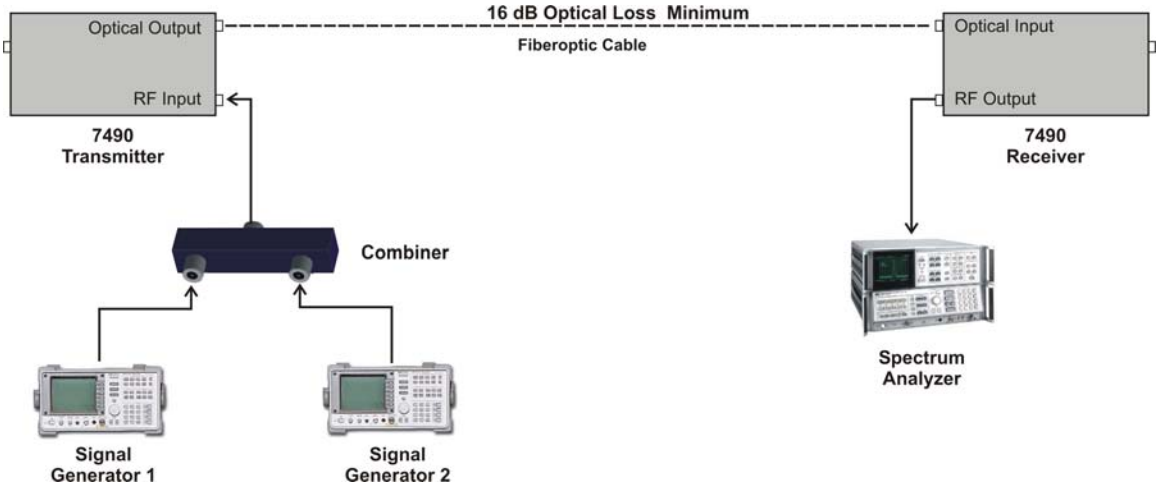


Figure 13 - Fiberoptic Alignment Setup

[5] If you are unable to perform this procedure refer to **Gain Control**, page 37 .

4. Product Specifications

The following section details the:

- 7490 IFL specifications
- Model dimensions
- 7490 IFL Pinouts
- 7180M Pinouts

4.1. 7490 IFL Specifications

RF Specifications	
Frequency Range	950 - 2150 MHz (3000 MHz optional)
Flatness 950 - 2150 MHz	± 1.0 dB (typical)
Flatness 950 - 3000 MHz[6]	± 2.5 dB (max.)
Flatness @ 36 MHz	± 0.2 (max.)
Input/Output Impedance	75 Ω (50 Ω option)
Input/Output VSWR	
@ 75 Ω	1.6:1 (max.)
@ 50 Ω	1.5:1 (max.)
Intermodulation Products[7]	-50 dBc (max.)
Input Signal Range (Total Power)[8]	-40 to -20 dBm
Output Signal Range (Total Power)	-40 to -20 dBm
CNR (@ 36 MHz / 16 dB optical loss	35 dB
Gain Control	Manual
Link Gain	0 ± 10 dB (within total power range)
OIP3[9]	+5 dBm
Noise Figure (typical)[10]	38 dB
SFDR[11]	102 dB Hz 2/3 @ -25 dBm (typ)
Maximum Input Power[12]	+ 10 dBm

[6] Flatness between 950 – 2150 MHz is ±1.5 dB. In the bandwidth between 2150 – 2500 MHz the flatness rises to ± 2.5 dB.

[7] At nominal conditions; can be adjusted by user

[8] Roughly equivalent to 10 channels of FM @ -50 to -30 dBm/channel

[9] @ -20 dBm input power @ IMD = -50 dBc

[10] @ Maximum Input @ 16 dB Optical Loss @ Unity Gain

[11] @ Maximum Input

Optical Specifications	
Optical Wavelength	1310 ± 10 nm (1550 nm optional)
Optical Power Output	3 to 7 dBm/2 to 5 mW
Optical Connector	FC/APC
Optical Budget	28 dB
Optical Return Loss	-60 dB
Physical Specifications	
Power for Standalone **Transmitter** **Receiver**	 +15 VDC @ 350 mA (470 mA @ temp. -10° C) +15 VDC @ 360 mA
Power for Rackmount (max.)	100 to 240 VAC 50/60Hz 90 Watts
Chassis Size	19" x 3U x 7"
Chassis Capacity	8 plug-ins, and 2 power supplies
Standalone Size	4" x 4.8" x 1.3"
Operating Temperature Range	-10° C to +55° C
Storage Temperature Range	-40° C to +85° C

All specs are subject to change without prior notice.

Note

Optical fiber plant must be singlemode 9/125 and low reflection. Use FC/APC connectors only.

[12] with no damage

4.2. Model Dimensions

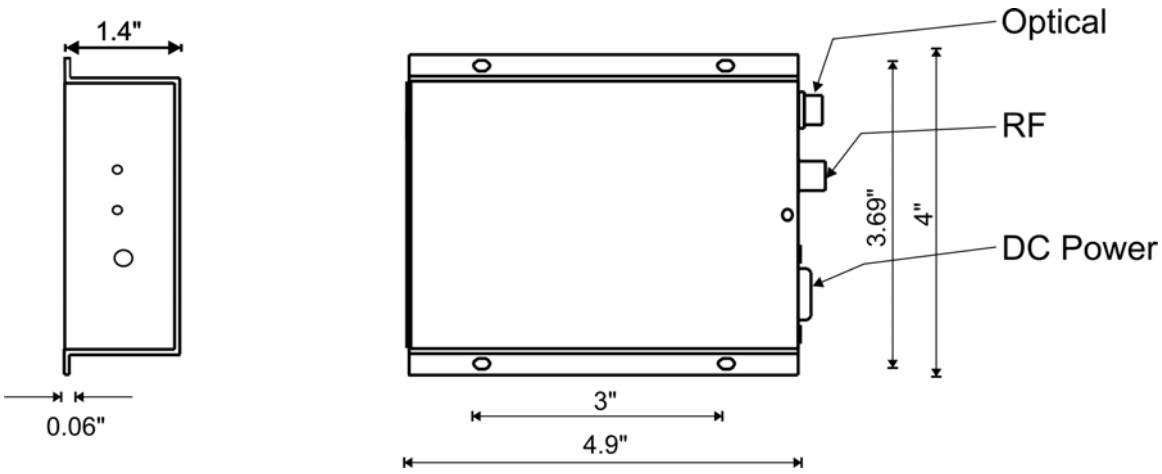


Figure 14 - Unit Dimensions

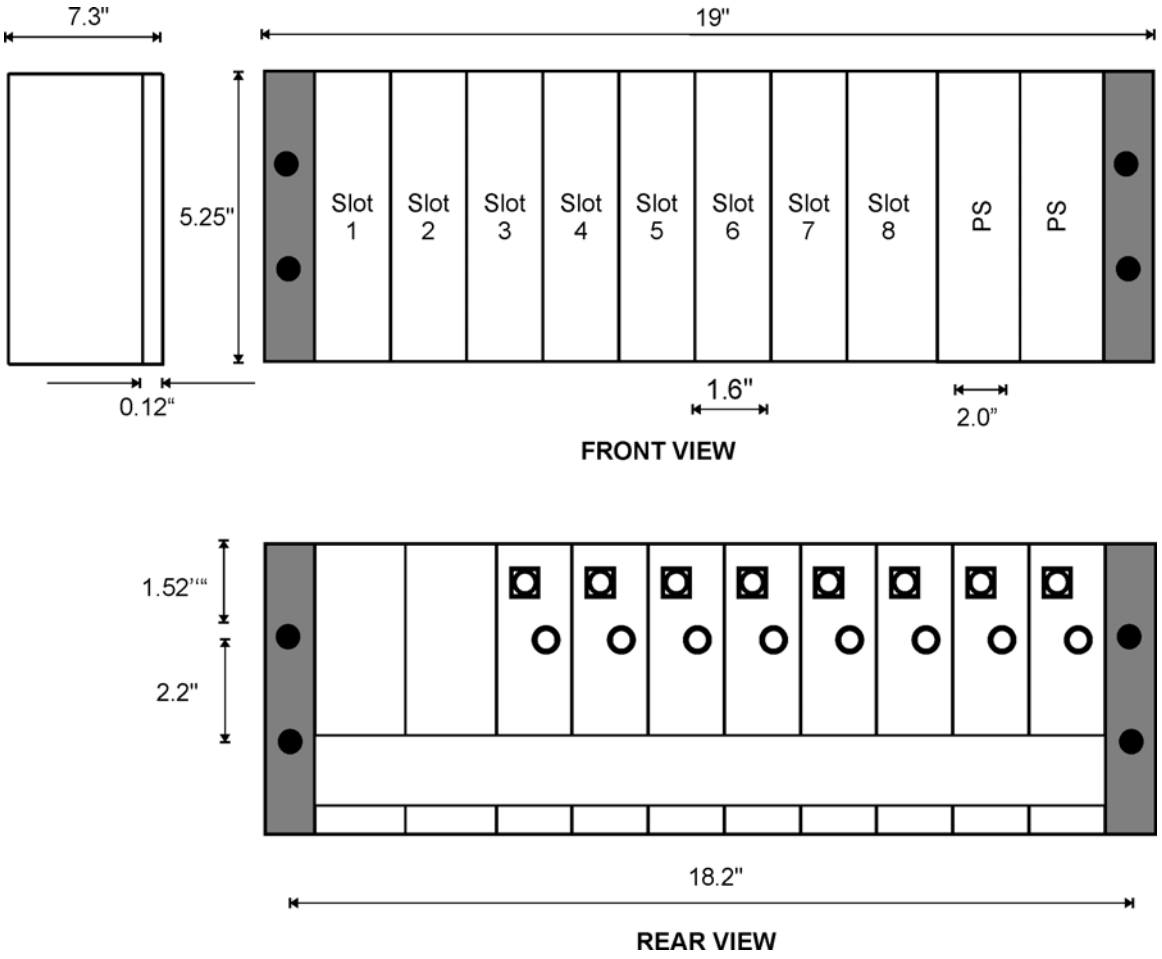


Figure 15 - 7180M Chassis Dimension

4.3. 7490 IFL Pinouts

Table 3 - 7490T Transmitter Pinout

Standalone 9 Pin Connector (J13)	7180M Chassis Back Panel Connector	2380 Relay Adaptor Connector	Name	Description
1	—	—	+15V Power	270 mA (excluding LNB drive)
2	—	—	Spare	Not Used
3	J11-P9 J12-P25 J13-P25	J2-P25 J4-P25	GND	Chassis Ground
4	J13-P1 to J13-P8	J4-P1 to J4-P8	RSSI	RF Signal Strength Indicator; Range 3.0 to 4.0V
5	J13-P9 to J13-P16	J4-P9 to J4-P16	PDI	Indicates Laser Optical Power; Range -2 to -4.5V
6	J13-P17 to J13-P24	J4-P17 to J4-P24	LSRI	Indicates Laser Bias; Range -4.2 to -4.8VDC
7	J12-P1 to J12-P8	J2: P1-P2 P3-P4, P5-P6 P7-P8, P9-P10 P11-P12 P13-P14 P15-P16	RFA	RF Alarm: Open collector interface.[13] Sinks current when RF level is low, up to 30 mA.
8	J12-P9 to J12-P16	**See Note Below**	OPTA	Optical Alarm: Open collector interface[14]. Sinks current at low optical, up to 30 mA.
9	J11-P1 to J11-P8		LNB Bias (optional)*	External LNB Bias

***Dependent on Order**

Note

If a 2380 Relay Adaptor is installed RF and Optical Levels are measured together; the alarm indicates a problem in either the RF or Optical Levels.

[13] If the 2380 Relay Adapter is installed, the alarms are dry contact. Refer to Appendix III The 2380 Relay Adaptor.

[14] If the 2380 Relay Adapter is installed, the alarms are dry contact. Refer to Appendix III The 2380 Relay Adaptor.

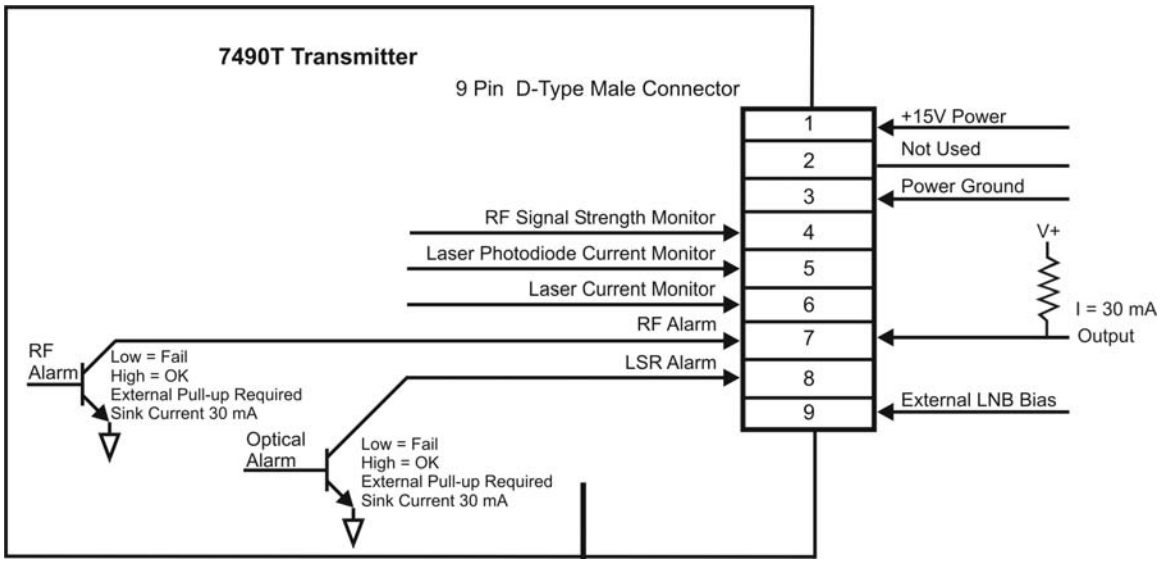


Figure 16 - 7490T Transmitter Pinout

Table 4 - 7490R Receiver Pinout

Standalone 9 Pin Connector (J14)	7100M Chassis Back Panel Connector	2300 Relay Adaptor Connector	Name	Description
1	—	—	+15V Power	360 mA
2	—	—	Spare	Not Used
3	J11-P9 J12-P25 J13-P25	J2-P25 J4-P25	GND	Chassis Ground
4	J13-P1 to J13-P8	J4-P1 to J4-P8	RSSI	RF Signal Strength Indicator; Range 0.2 - 10VDC
5	J13-P9 to J13-P16	J4-P9 to J4-P16	PDI	Indicates Received Optical Power
6	—	—	Spare	Not Used
7	J12-P1 to J12-P8	J2: P1-P2 P3-P4 P5-P6 P7-P8 P9-P10 P11-P12 P13-P14 P15-P16	RFA	RF Alarm: Open collector interface[15]. Sinks current when RF level is low, up to 30 mA.
8	J12-P9 to J12-P16	**See Note Below**	OPTA	Optical Alarm: Open collector interface[16]. Sinks current when optical level is low, up to 30 mA.
9	—	—	Spare	Not Used

Note

If a 2380 Relay Adaptor is installed RF and Optical Levels are measured together; the alarm indicates a problem in either the RF or Optical Levels.

[15] If the 2300 Relay Adapter is installed, the alarms are dry contact. Refer to Appendix III The 2380 Relay Adaptor.

[16] If the 2300 Relay Adapter is installed, the alarms are dry contact. Refer to Appendix III The 2380 Relay Adaptor..

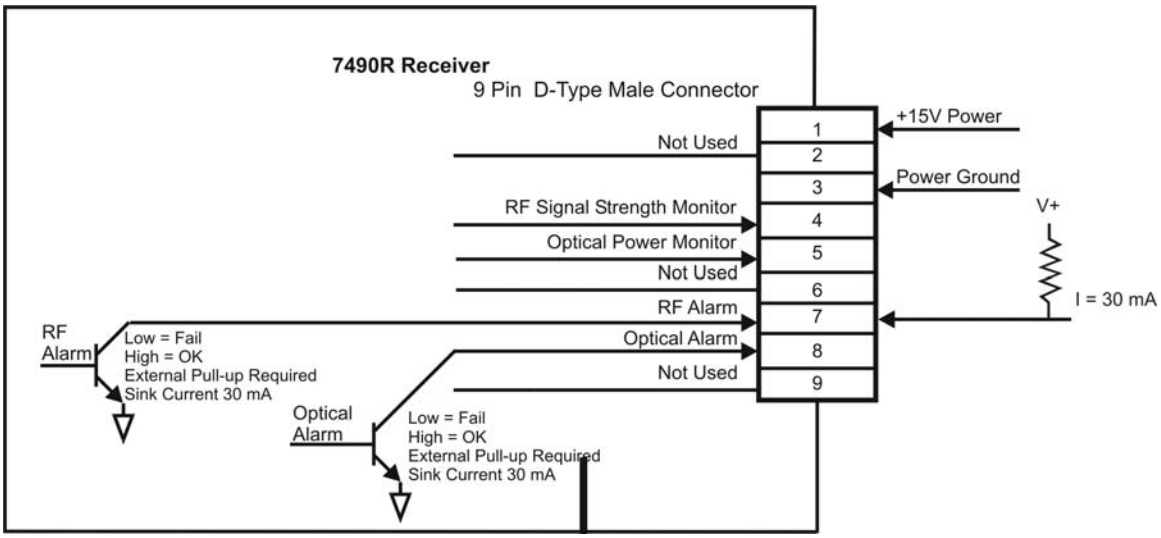


Figure 17 - 7490R Receiver Pinout

CAUTION

When monitoring the voltage outputs use only a high resistance DVM.

4.4. 7180M Chassis Pinouts[17]

The unit's pins are found at the backplane of the 7180M chassis. The 7180M chassis backplane incorporates 8 slots. Pinouts from the nine pin connector at each slot are sent through the backplane assembly to the two 25 pin D connectors, J12 and J13, and one nine pin connector, J11. Any monitor voltages to be measured may be done between the chassis ground and the required pin.

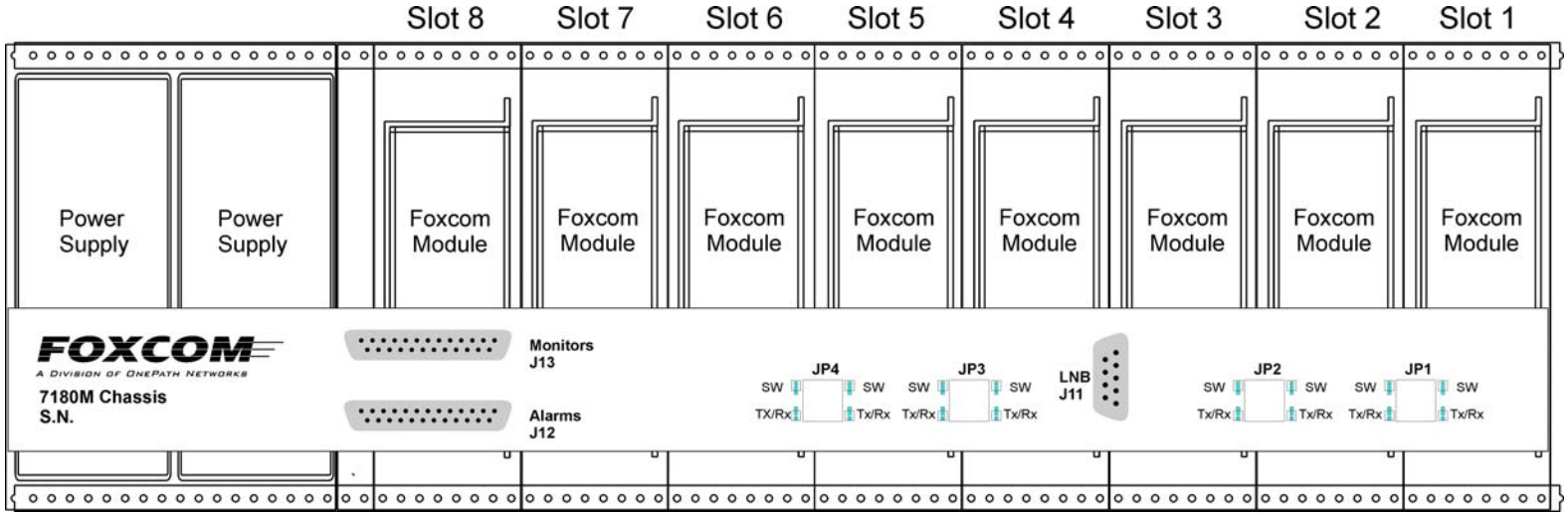


Figure 18 - 7180M Chassis Rear View

[17] Refer to Appendix V Pinouts, Detailed Information for further information..

The pins are numbered as follows:

Table 5 - 7180M Alarm Connector (J12) Pinouts

Pin No.	Function	Name	Slot No.
1	RF Alarm	RfAlm1	1
2	RF Alarm	RfAlm2	2
3	RF Alarm	RfAlm3	3
4	RF Alarm	RfAlm4	4
5	RF Alarm	RfAlm5	5
6	RF Alarm	RfAlm6	6
7	RF Alarm	RfAlm7	7
8	RF Alarm	RfAlm8	8
9	Optical Alarm	OptAlm1	1
10	Optical Alarm	OptAlm2	2
11	Optical Alarm	OptAlm3	3
12	Optical Alarm	OptAlm4	4
13	Optical Alarm	OptAlm5	5
14	Optical Alarm	OptAlm6	6
15	Optical Alarm	OptAlm7	7
16	Optical Alarm	OptAlm8	8
17			
18			
19			
20			
21	Standby Power Supply	SPSNOP	
22	Standby Power Supply	SPSCOM	
23	Main Power Supply	MPSNOP	
24	Main Power Supply	MPSCOM	
25	Chassis Ground	GND	

Table 6 - 7180M Monitor Connector (J13) Pinout

Pin No.	Function	Name	Slot No.
1	RSSI Monitor	RSSI1	1
2	RSSI Monitor	RSSI2	2
3	RSSI Monitor	RSSI3	3
4	RSSI Monitor	RSSI4	4
5	RSSI Monitor	RSSI5	5
6	RSSI Monitor	RSSI6	6
7	RSSI Monitor	RSSI7	7
8	RSSI Monitor	RSSI8	8
9	PDI Monitor	PDI1	1
10	PDI Monitor	PDI2	2
11	PDI Monitor	PDI3	3
12	PDI Monitor	PDI4	4
13	PDI Monitor	PDI5	5
14	PDI Monitor	PDI6	6
15	PDI Monitor	PDI7	7
16	PDI Monitor	PDI8	8
17	LSRI Monitor	LSRI1	1
18	LSRI Monitor	LSRI2	2
19	LSRI Monitor	LSRI3	3
20	LSRI Monitor	LSRI4	4
21	LSRI Monitor	LSRI5	5
22	LSRI Monitor	LSRI6	6
23	LSRI Monitor	LSRI7	7
24	LSRI Monitor	LSRI8	8
25	Chassis Ground	GND	

Table 7 - LNB Connector (J11) Pinout

Pin No.	Function	Name	Slot No.
1	LNB Powering	LNB1	1
2	LNB Powering	LNB2	2
3	LNB Powering	LNB3	3
4	LNB Powering	LNB4	4
5	LNB Powering	LNB5	5
6	LNB Powering	LNB6	6
7	LNB Powering	LNB7	7
8	LNB Powering	LNB8	8
9	GND	GND	

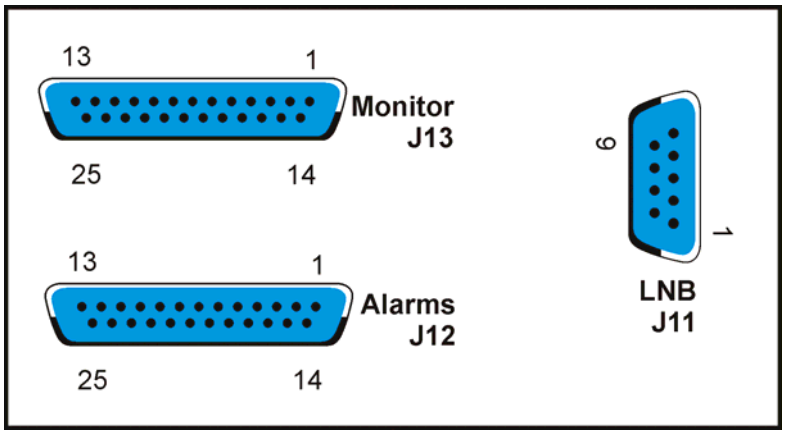


Figure 19 - 7180M Pin Numbers

4.4.1. 7180M and Redundancy Switching

The 2000 Switch provides optional 1:1 redundancy switching for all Foxcom Interfacility Links. If the customer chooses to add redundancy switching to the link, the pin connector jumpers need to be moved. Detailed instructions on moving the jumpers are provided in the *Model 2000 1:1 Redundant Switch Installation and User's Guide (Document Number 93-010-01).*

5. Gain Control

The 7490 IFL unit requires no maintenance, but the user can adjust the transmitter and receiver gain by 20 dB. The gain can be ± 10 dB.

All internal adjustments have been set up at the factory; the only user adjustments are input and output RF signal levels accessible from the front panel and described in the following sections. A detailed procedure for optimizing the gain control is provided in Section 3.6 Aligning the Fiberoptic Link.

If you do not have a signal generator or spectrum analyzer, adjust the gain according to the following procedure.

To adjust the Transmitter Gain:

1. Set the input power to the expected power level.
2. Set the nominal RSSI signal at 3.5 V ± 0.5.

To adjust the Receiver Gain:

1. Set the input power to the expected power level.
2. Set the nominal RSSI signal at 5.0 V ± 2.

6. Troubleshooting

The 7490 IFL was tested before it left the factory. However if you are experiencing difficulties consult the list below for possible solutions. If your system is still experiencing problems, please attempt to isolate and identify the malfunctioning unit.

Table 8 - Troubleshooting

PROBLEM	POSSIBLE CAUSE
1. Laser LED not on	1. No DC power to the unit. Possible power supply problem or AC power input problem. Check the power supply fuse. 2. Verify LSRI monitor is between -4.8 and -4.2VDC. If not, laser may have overheated. Disconnect power or remove plug in and allow cooling. Try again with better airflow. 3. If an optical power meter is available, measure the optical power out of the transmitter. The power should between 2 to 5 mW (+3 to +7 dBm). If an optical power meter is not available, then use another receiver to determine if there is optical power emerging from the transmitter (use the 5 meter jumper cable). If there is no optical power, then the transmitter unit is malfunctioning. If any or all the above are not within the guidelines, the transmitter unit is faulty.
2. Lack of RF signal present at Receiver, yet optical power is functioning.	1. If the unit has an LNB drive option, verify that the correct LNB bias is coming down the center of the RF connector at the transmit site. 2. Verify that the dish is pointed and correctly receiving satellite signals. Conclusion: If signal still not present then Transmitter input stage amplifier is defective. Contact Foxcom.

PROBLEM	POSSIBLE CAUSE
3. No optical power, LED not illuminated.	1. There is a break or severe bend in the fiberoptic cable. Use an optical power meter or another functioning receiver unit to verify optical power coming down the fiber. 2. Optical power too low, too many splits, too long a distance (thus exceeding optical budget). System *may still function* without LED illuminated although at reduced performance. 3. The transmitter is not functioning, see above.
4. Optical power light illuminated with disconnected optical input.	Damaged (leaky) photodiode. Unit may still function, otherwise contact Factory for service.

7. Appendix 1 Cleaning Fiberoptic Connections

The unit has an FC/APC angle polished optical connector for very high optical return loss performance. The units are specified into singlemode fiber i.e. 9/125 micron core diameter. Full performance is specified only for low return loss optical plant - meaning that the fiber must be fusion spliced and all connections or splices must have a return loss greater than -60 dB. With these guidelines in mind, link lengths beyond 20 kilometers (DFB based products) can be achieved with high performance. Specific performance and/or design assistance is available by request from Foxcom.

If there is low/no signal or noisy signal at a Foxcom module, the connector should be cleaned. Dirt on the inside connector tip can impair the flow of light causing problems in signal transmission. Foxcom modules are sealed but dirt can occasionally enter during installation and alignment.

The input and output optical ports of all Foxcom equipment are known in the fiber optic world as bulkhead ports. Foxcom uses FC/APC connectors.

The purpose of this document is to define the cleaning procedure for the FC/APC bulkhead fiberoptic ports and for the fiberoptic connector which is connected to the bulkhead port.

The following materials are representative of the types of cleaning materials that should be used for cleaning the fiberoptic ports and connectors. They are available from several suppliers.

Description	**Manufacturer**
Kimwipes	Kimberly Clark
Cletop Automatic Connector Cleaner	Cletop
Fiberoptic Swab	Cletop or FIS
Fiberoptic Compressed Air	Chemtronics

Wiping clothes should be made of lint free alcohol free nonabrasive materials. Swabs should have a tightly wrapped tip and be talcum free. For removing dust from receptacles, a canned compressed gas is recommended. Do not use commercial compressed air because of risk of contamination.

7.1. Cleaning Procedures for FC/APC Connectors

Use a Kim Wipe to gently wipe the end face surface of the connector. Alternatively a Cletop automatic connector cleaner can be used.

Figure 20 - Wiping the Connector with a Kim Wipe

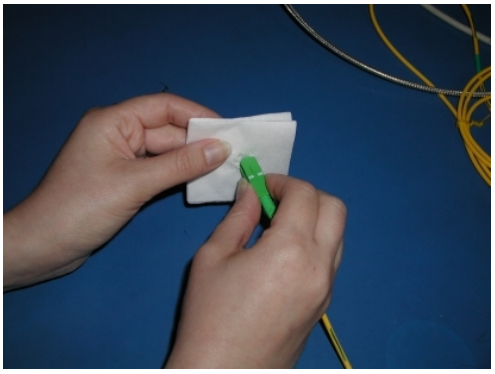


Figure 21 - Wiping the Connector with a Kim Wipe (2)

7.2. Cleaning Procedure for FC/APC Bulkhead Ports

CAUTION

Clean the transmitter and receiver optical ports only when there is evidence of contamination or reduced performance.

7.2.1. Swab Method

Using a clean fiber optic cleaning swab, gently wipe out the optical port. Discard the swab after use.

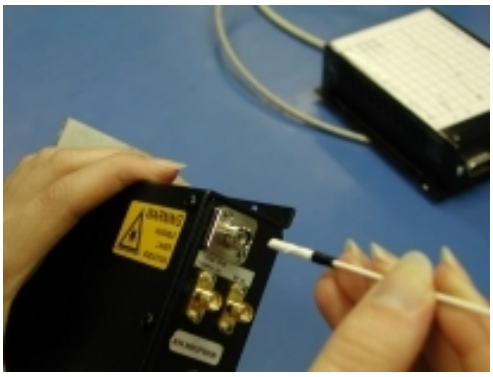


Figure 22 - Cleaning the Optical Port

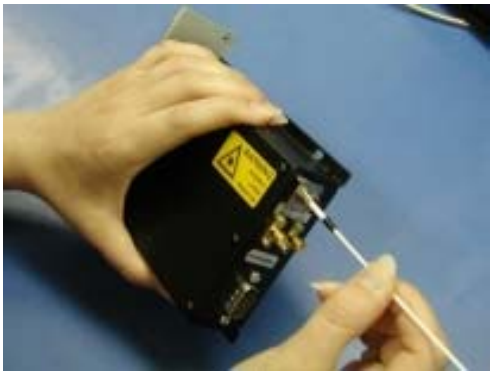


Figure 23 - Cleaning the Optical Port (2)

7.2.2. Compressed Air Method

Using the extension tube of the compressed air, blow into the port to remove any dust or debris. Do not allow the tube to touch the bottom of the port. Do not use commercial compressed air due to potential oil contamination.

Note

To prevent contamination, the optical ports should be connected or covered with a dust cap at all times.

Use dry air or nitrogen only.

8. Appendix II Installing a Standalone Unit

To install the 7490T-STD or 7490R-STD Standalone:

1. Place the 7490 unit on the standalone flange, matching the holes.
2. Using four screws (#4 or #6) secure the unit and the flange to the wall.
3. Apply AC power to the standalone power supply unit.
4. Connect the 7490 unit to the power supply. The Laser LED should be lit.

All remaining steps are the same as in the product manual. Refer to Setting up the Transmitter on page 17, and Setting Up the Receiver on page 20.

9. Appendix III The 2380 Relay Adaptor

The following section describes how to install the 2380 Relay Adaptor onto the 7180M Chassis. The 2380 Relay Adaptor assembly provides dry contact output signals as an option to the standard open collector signals available on the 7180M chassis backplane.

If the 2380 Relay Adaptor is ordered separately from the 7180M chassis, it must mounted by the user. The 2380 is easily mounted directly over the connectors on the 7180M backplane, as shown below.

9.1. Installing the 2380 - Parts Needed

- 2380 Relay Adapter
- Two pin guides
- Four one inch screws
- Screw driver

9.2. Installing the 2380 - Procedure

To mount to the 2380 Relay Adapter:

WARNING

DO NOT PERFORM THIS PROCEDURE BEFORE DISCONNECTING THE ELECTRICITY

1. Disconnect the electricity.
2. Make sure that you have all the needed equipment.
3. Install the pin guides.

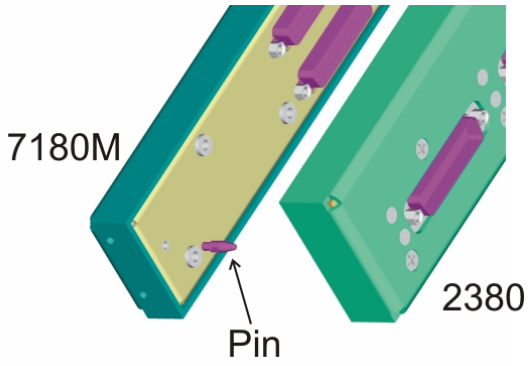


Figure 24 - Mounting the Chassis and Adaptor - Detail

4. Mount the unit onto the pin guides.

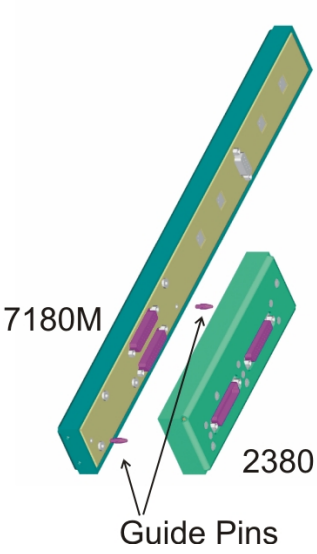


Figure 25 - Mounting the Pins and Adaptor

5. Mount the four screws. The screws must be installed in the order shown in Figure 26 and Figure 27.

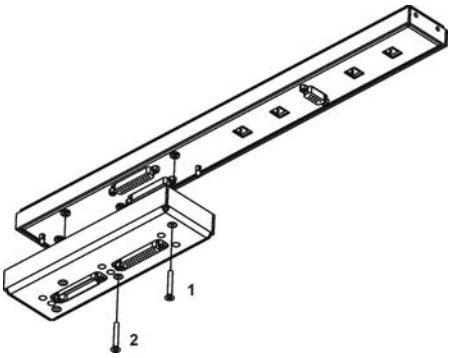


Figure 26 - Mounting the Screws (1)

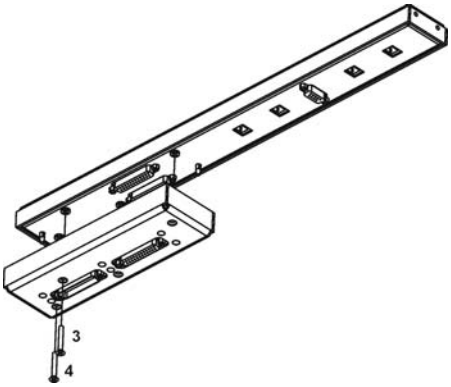


Figure 27 - Mounting the Screws (2)

CAUTION

Use only the mounting screws provided by Foxcom. Using other screws can permanently damage the unit!

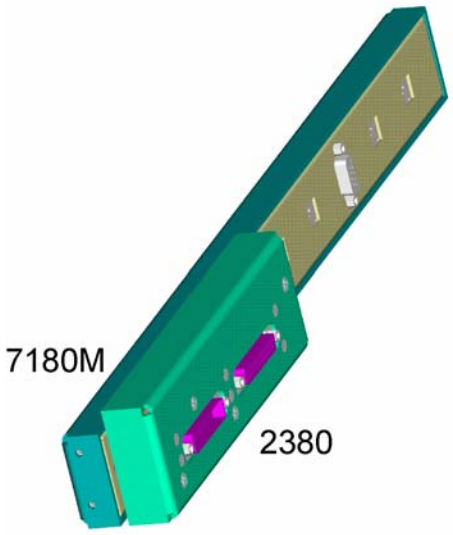


Figure 28 - Mounted 2380

6. Connect the cables.

9.3. 2380 Dimensions and Front Panel Label

Figure 29 - 2380 Dimensions

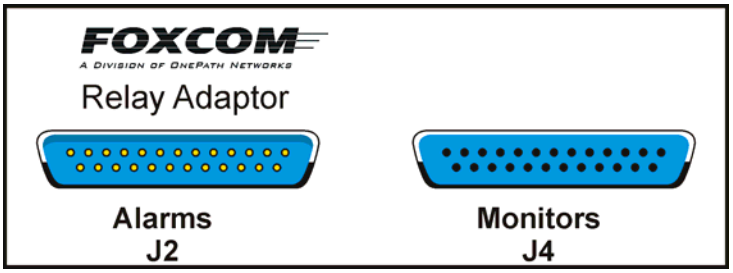


Figure 30 - 2380 Front Label

9.4. 2380 Pinouts

The following table details the 2380 Alarms pinout.

Table 9 - 2380 Alarms Pinout (J2)

Pin Number	Function	Name	Slot Number
1	Alarm	NOP1	1
2	Alarm	COM1	1
3	Alarm	NOP2	2
4	Alarm	COM2	2
5	Alarm	NOP3	3
6	Alarm	COM3	3
7	Alarm	NOP4	4
8	Alarm	COM4	4
9	Alarm	NOP5	5
10	Alarm	COM5	5
11	Alarm	NOP6	6
12	Alarm	COM6	6
13	Alarm	NOP7	7
14	Alarm	COM7	7
15	Alarm	NOP8	8
16	Alarm	COM8	8
17			
18			
19			
20			
21			
22			
23	Main PS Alarm	MPSA	
24	Standby PS Alarm	SPSA	
25	Power Supply Comm.	PSCOM	

Note

Alarms in Pins 1 through 16 function if there is either a RF or Optical signals failure.

Table 10 - 2380 Monitor Connector Pinout (J4)

Pin No.	Function	Name	Slot No.
1	RSSI Monitor	RSSI	1
2	RSSI Monitor	RSSI	2
3	RSSI Monitor	RSSI	3
4	RSSI Monitor	RSSI	4
5	RSSI Monitor	RSSI	5
6	RSSI Monitor	RSSI	6
7	RSSI Monitor	RSSI	7
8	RSSI Monitor	RSSI	8
9	PDI Monitor	PDI1	1
10	PDI Monitor	PDI2	2
11	PDI Monitor	PDI3	3
12	PDI Monitor	PDI4	4
13	PDI Monitor	PDI5	5
14	PDI Monitor	PDI6	6
15	PDI Monitor	PDI7	7
16	PDI Monitor	PDI8	8
17	LSRI Monitor	LSRI1	1
18	LSRI Monitor	LSRI2	2
19	LSRI Monitor	LSRI3	3
20	LSRI Monitor	LSRI4	4
21	LSRI Monitor	LSRI5	5
22	LSRI Monitor	LSRI6	6
23	LSRI Monitor	LSRI7	7
24	LSRI Monitor	LSRI8	8
25	Chassis Ground	GND	

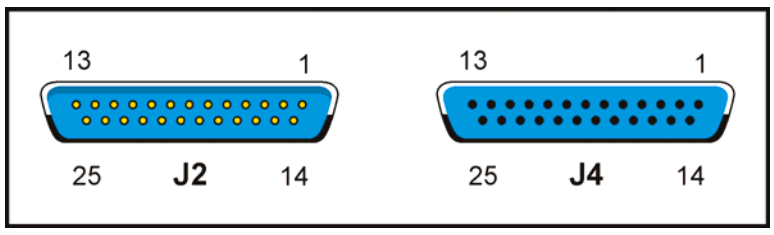


Figure 31 - 2380 Pin Numbers

10. Appendix IV 7100M Chassis

The 7100M Chassis is a standard Foxcom Chassis which holds up to 6 links.

If 7490 IFL is being installed into a 7100M the following information should be used for installing and checking the unit.

10.1. Equipment Safety

To avoid damaging your product, please observe the following:

1. Fuses: To avoid possibility of fire hazard, always replace fuses with the same type and rating of fuse as recommended on the power supply rear label.
In the US/Canada 1A fuses must be used (**refer to page 71**).
In Europe/Asia/South America 0.5A fuses must be used.

2. The input of the transmitter has an optional built-in bias for inserting DC power up the coax to the LNB. Make certain any equipment or test equipment connected to the transmitter input can withstand this bias.

3. The transmitter and receiver output are DC coupled and can withstand the bias from a satellite receiver. ***Do not exceed 25V DC bias.***

4. Do not allow any dirt or foreign material to get into the optical connector bulkheads. This may cause damage to the polished optical connector end faces.

5. The optical fiber jumper cable bend radius is 3 cm. Smaller radii can cause excessive optical loss and/or fiber breakage.

6. If multiple transmitters are installed in the chassis allow sufficient room for adequate ventilation; otherwise the units may overheat causing possible safety hazard or equipment damage.

7. When several units are installed on one 7100M chassis, ensure that the total units current (including any LNB bias) does not exceed 2A per power supply.

CAUTION

If several units in one chassis use the LNB option, the total current may exceed 2A. Over current in this configuration and a failure of one power supply may blow the fuse in the spare power supply.

10.2. Installation

The following section details the steps in the installation process which differ from units installed in the 7180M Chassis. All other steps are the same.

The following section details:

- How to setup the 7490 IFL units
- The 7490 IFL Front Panels.

CAUTION

By default, an 7490 IFL installed in a 7100M is set to 230V. To change the voltage to 115V, refer to page 70.

Observe all warnings and cautions mentioned at the beginning of this manual (page 10). If after set-up you experience problems, refer to Troubleshooting on page 38.

10.2.1. Setting up the Transmitter

1. Place the 7490T in the 7100M Chassis. The operating base plate temperature must be between -10° C to 55° C.

2. Apply AC power to the chassis. The Power Supply's LED should be lit.

3. Mount the 7490T into the chassis. The Laser LED should be lit.

4. Using an optical power meter, measure the optical power. Insert the meter's cable into the Transmitter's optical connector. Power levels should be between 2 - 5 mW (+3 to +7 dBm).

Alternatively, use a DVM to measure the voltage at:

- pins J10-P13 through J10-P18 for the slot being measured (Refer to Table 14 on page 63 for details regarding J10 pinouts) (7100M Rackmount)
- at pin #6 of the 9 pin connector (standalone)

The voltage level should be -4.2 to -4.8VDC.

5. On the rear panel, connect the coax cable to the RF Input Connector.

6. On the rear panel, connect the fiberoptic cable to the Optical Connector.

7. Adjust the Gain Control Potentiometer to give the desired output power. Using a small screw driver, turn the potentiometer (located on the front panel) to increase or decrease the gain.

- To ***increase*** the gain, turn the gain control clockwise.
- To ***decrease*** the gain, turn the gain control counterclockwise.
- For more information refer to Aligning the Fiberoptic on page 25.

Note

If either LED is not lit, refer to Troubleshooting.

CAUTION

When monitoring the voltage outputs use only a high resistance DVM.

10.2.2. Setting Up the Receiver

1. Place the 7490R Receiver in the 7100M Chassis. The operating base plate temperature must be between -10° C to 55° C.

2. Apply AC power to the chassis. The Power Supply's LED should be lit.

3. Mount the 7490R into the chassis.

4. On the rear panel connect the fiberoptic cable to the Optical Connector. The Opt. LED should be lit (if the Transmitter is operating correctly).

5. Using an optical power meter, measure the optical power coming to the Receiver from the fiberoptic cable. The power levels of the Receiver should be the power level measured at the Transmitter minus the fiber loss[18].

[18] Fiber loss is defined as:
(attenuation/km x length (km) of the fiberoptic cable) + (1.0 dB x number of connectors).
For example if a signal with an optical wavelength of 1310 nm is transmitted over a link 10 kilometers long which had two connectors the loss would be:
(0.4 dB/km x 10 km) + (0.5 dB x 2) = 5.0 dB

Alternatively if a signal with an optical wavelength of 1550 nm is transmitted over a link 10 kilometers long which had two connectors the loss would be:
(0.27 dB/km x 10 km) + (0.5 dB x 2) = 2.7 dB

Alternatively, use a DVM to measure the voltage at:

- pins J10-P7 through J10-P12 for the slot being measured (Refer to Table 14 on page 63 for details regarding J10 pinouts) (7100M Rackmount). The voltage level should be 1V for each 1 mW measured at the Receiver input.
- at pin #5 of the 9 pin connector (standalone)

6. On the rear panel, connect the coax cable to the RF Output Connector.

7. Adjust the Gain Control Potentiometer to give the desired output power. Using a small screw driver, turn the potentiometer (located on the front panel) to increase or decrease the gain.

- To ***increase*** the gain, turn the gain control clockwise.
- To ***decrease*** the gain, turn the gain control counterclockwise.
- For more information refer to Aligning the Fiberoptic on page 25.

Note

If either LED is not lit, refer to to Troubleshooting on page 37.

10.2.3. Powering the IFL

- Transmitter power requirement: 15VDC @ 350mA (excluding LNB Drive option).
- Receiver power requirement: 15VDC @ 360mA.
- The Standalone Transmitter/Receiver is powered by a user-supplied external DC power supply.
- The Rackmount Transmitters/Receivers are plugged into the rackmount chassis. The chassis can accept and power up to six units.

Note

At temperatures below -10°C, the Transmitter's internal heater will require an additional 120 mA. The Transmitter's total power requirement will then be 470 mA.

CAUTION

Ensure that there is a good airflow around the chassis rackmount.

Note

By default the power supply is set to 220V (0.5A).

7100M Chassis

The 7100M Chassis provides power to the plug in units. The power supply is a linear unregulated type. Each plug-in regulates its own voltage. The power supply provides:

- 15 to 18 VDC (unregulated) @ 2.2 amps power
- AC input @ 110/220 VAC (user selected)
- Units can be plugged in "hot standby"
- An internal 5 amp fuse (refer to Table 17, page 71 for the fuse part numbers)

7000S (Optional) Hot Standby Power Supply

For applications demanding the utmost in reliability and uptime, the 7000S standby power supply can be optionally plugged in to the standard chassis. The 7000S features hot swapping - supplies may be installed and removed even during operation. Each power supply is fully redundant and can power a completely loaded chassis on its own should its "partner" fail. During normal operation the two units share the load by means of current steering diodes located on the rear panel.

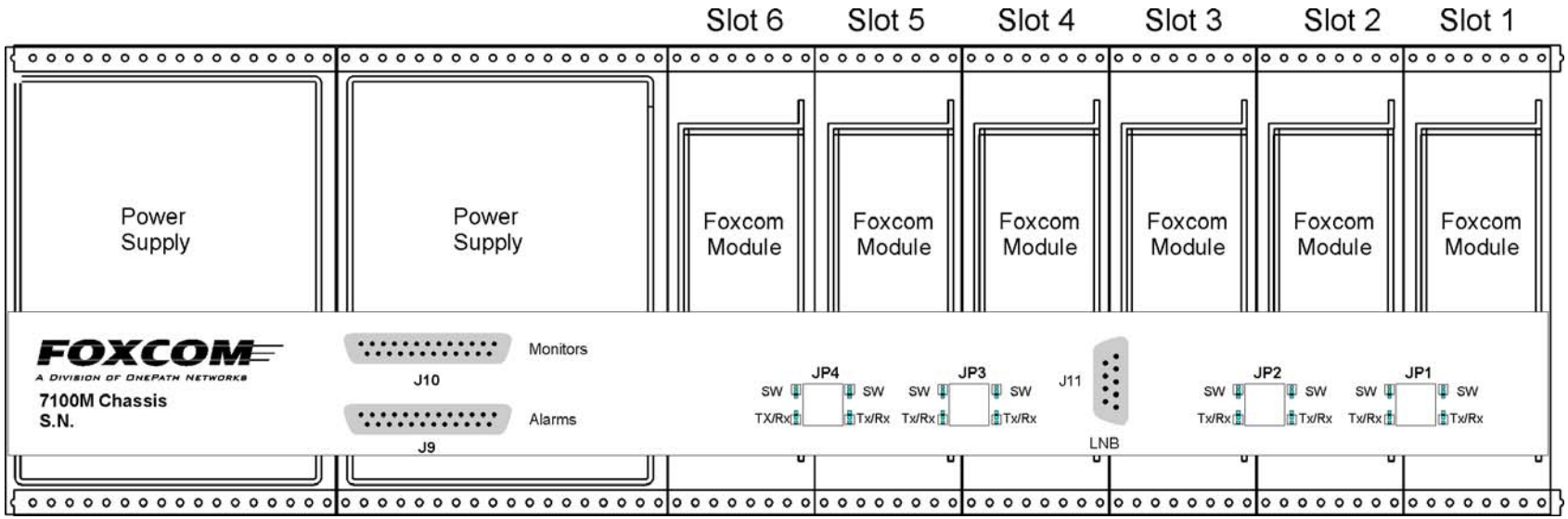


Figure 32 - 7100M Chassis Rear View

10.2.4. Connecting the Back Panel Jumpers

On the rear panel of the 7100M Back Panel are product connectors (JP1 to JP4). The 3 pin connectors (male) are the connecting point between the slots and the back panel. One pin is for the transmitter/receiver (Tx/Rx), one is for the optional 2000 1:1 Redundant Switch, and one is for the 7100M. A 2 pin jumper (female) is placed on the relevant pins to complete the connection between the 7100M and the units. For example, if a 2000 Switch is being used, the jumper is placed on the Switch-7100M pins.

To connect the jumpers:

1. Each jumper has two sets of pins, upper and lower. The upper pins are labeled SW (Switch) and the lower pins Tx/Rx.

2. If the 7180M has Tx or Rx units only, place all jumpers on the lower two pins.

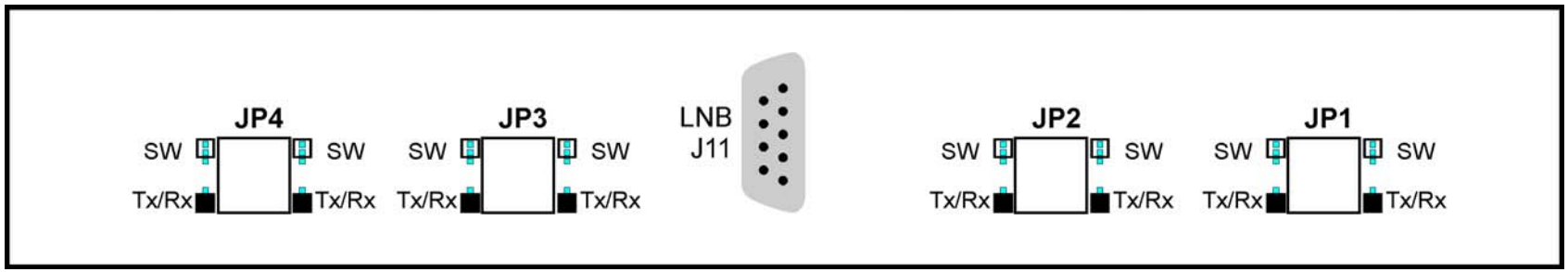


Figure 33 - Jumper Installation: Tx and Rx Only

3. If the 2000 Switch is installed in Slot 2, place the JP1 and JP2 jumpers on the higher two pins and the JP3 and JP4 jumpers on the lower two pins.

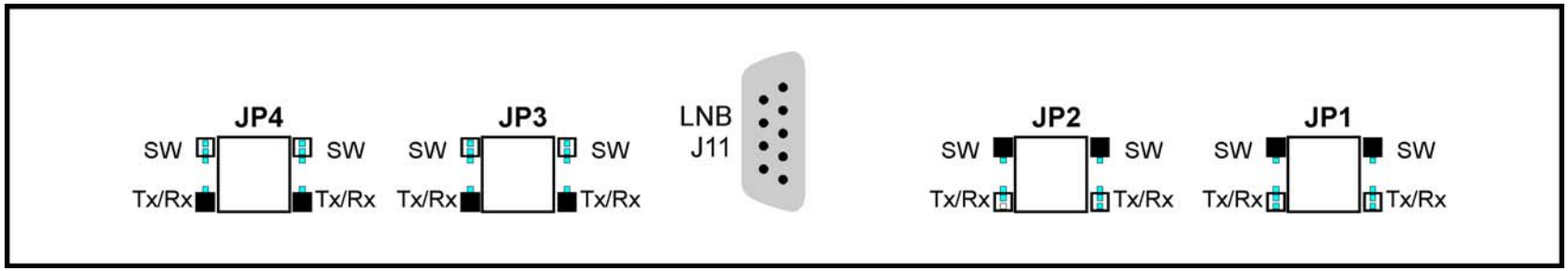


Figure 34 - Jumper Installation: 2000 Switch in Slot 2

4. If the 2000 Switch is installed in Slot 5, place the JP1 and JP2 jumpers on the lower two pins and the JP3 and JP4 jumpers on the higher two pins.

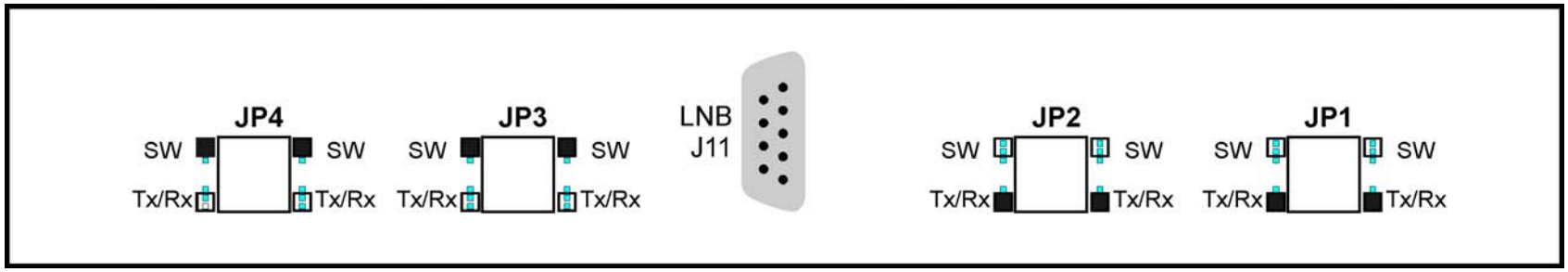


Figure 35 - Jumper Installation: 2000 Switch in Slot 5

5. If the 2000 Switch is installed in Slots 2 and 5, place the JP1, JP2, JP3, and JP4 jumpers on the higher two pins.

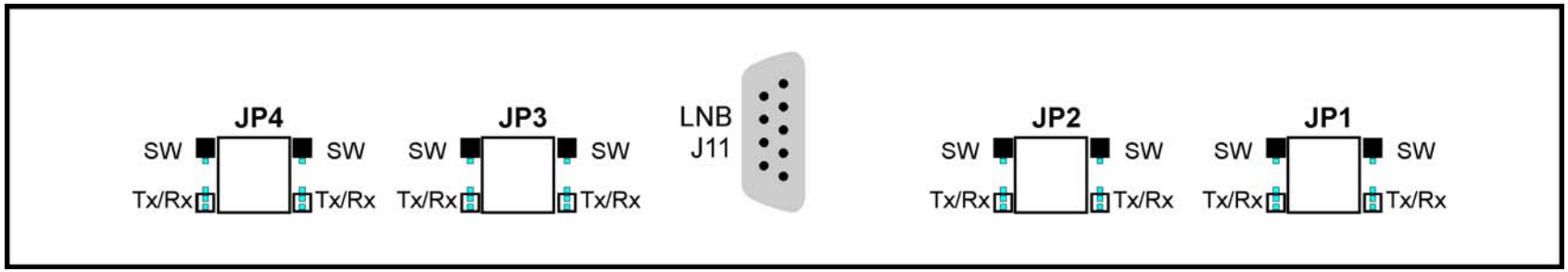


Figure 36 - Jumper Installation: 2000 Switch in Slots 2 and 5

10.3. Model Dimensions

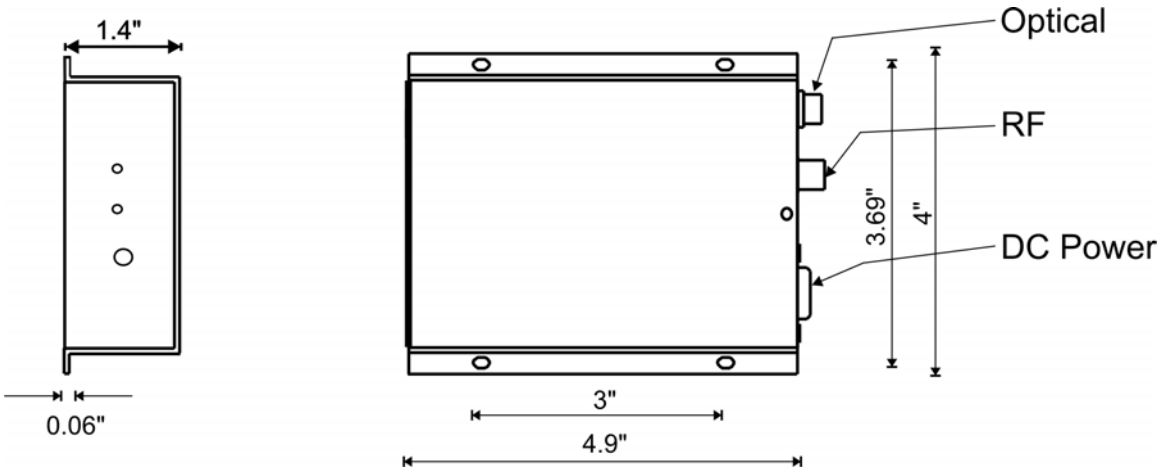


Figure 37 - Unit Dimensions

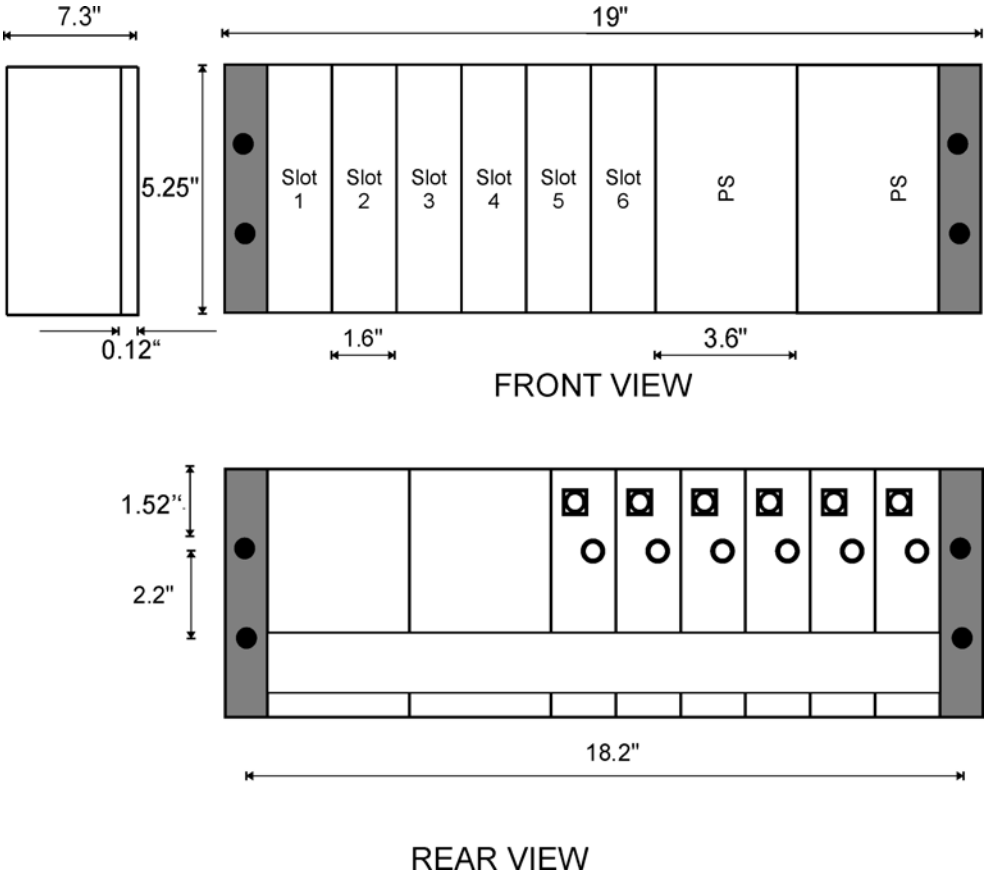


Figure 38 - 7100M Chassis Dimensions

10.4. 7490 IFL Pinouts (7100M Chassis)

Table 11 - 7490T Transmitter Pinout

Standalone 9 Pin Connector (J14)	7100M Chassis Back Panel Connector	2300 Relay Adaptor Connector	Name	Description
1	—	—	+15V Power	270 mA (excluding LNB Option)
2	—	—	Spare	Not Used
3	J9-P25 J10-P25 J11-P9	J2-P25 J4-P25	GND	Chassis Ground
4	J10-P1 to J10-P6	J4-P1 to J4-P6	RSSI	RF Signal Strength Indicator; Range 3.0 to 4.0VDC
5	J10-P7 to J10-P12	J4-P7 to J4-P12	PDI	Indicates Laser Optical Power; Range -2 to -4.5V
6	J10-P13 to J10-P18	J4-P13 to J4-P18	LSRI	Indicates Laser Bias; Range -4.2 to -4.8VDC
7	J9P1-J9P6	J2-P2, P5, P8, P11, P14, P17	RF Alarm	RF Alarm: Open collector interface.[19] Sinks current at low RF, up to 30 mA
8	J9-P14 to J9-P19	J2-P1, P4, P7, P10, P13, P16	OPTA	Optical Alarm: Open collector interface.[20] Sinks current at low optical, up to 30 mA
9	J11-P1 to J11-P6	—	LNB Bias (optional)*	External LNB Bias

***Dependent on order**

[19] If the 2300 Relay Adapter is installed, the alarms are dry contact.

[20] If the 2300 Relay Adapter is installed, the alarms are dry contact.

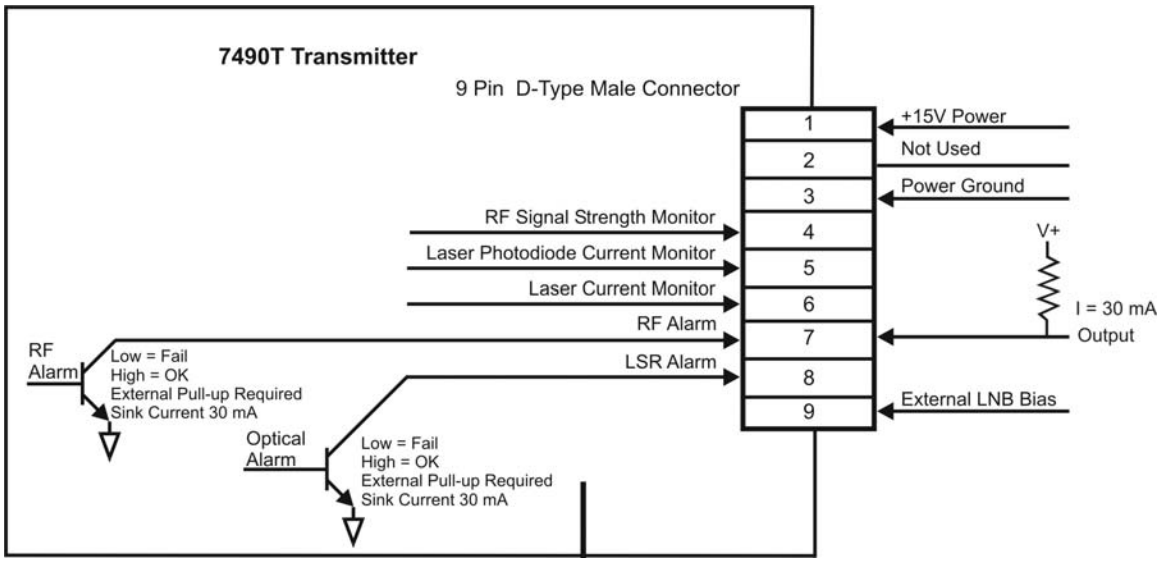


Figure 39 - 7490T Transmitter Pinout

CAUTION

When monitoring the voltage outputs use only a high resistance DVM.

Table 12 - 7490R Receiver Pinout

Standalone 9 Pin Connector (J14)	7100M Chassis Pin Back Panel Connector	2300 Relay Adaptor Connector	Name	Description
1	—	—	+15V Power	360 mA
2	—	—	Spare	Not Used
3	J9-P25 J10-P25 J11-P9	J2-P25 J4-P25	GND	Chassis Ground
4	J10-P1 to J10-P6	J4-P1 to J4-P6	RSSI	RF Signal Strength Indicator; Range 0.2 - 10VDC
5	J10-P7 to J10-P12	J4-P7 to J4-P12	PDI	Indicates Optical Power Received
6	—	—	Spare	Not Used
7	J9-P1 to J9-P6	J2-P2, P5, P8, P11, P14, P17	RF Alarm	RF Alarm: Open collector interface[21]. Sinks current when RF level is low, up to 30 mA.
8	J9-P14 to J9-P19	J2-P1, P4, P7, P10, P13, P16	OPTA	Optical Alarm: Open collector interface[22]. Sinks current when optical level is low, up to 30 mA.
9	—	—	Spare	Not Used

[21] If the 2300 Relay Adapter is installed, the alarms are dry contact. .

[22] If the 2300 Relay Adapter is installed, the alarms are dry contact.

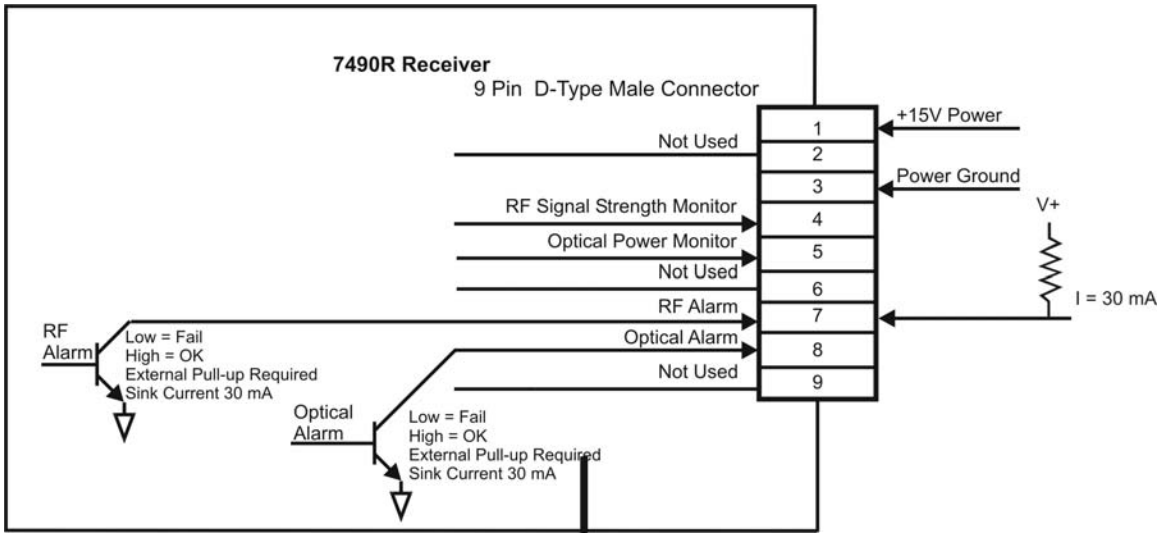


Figure 40 - 7490R Receiver Pinout

10.5. 7100M Chassis Pinouts

The unit's pins are found at the backplane of the 7100M chassis. The 7100M chassis backplane incorporates 6 slots. Pinouts from the nine pin connector at each slot are sent through the backplane assembly to the two 25 pin D connectors, J9 and J10, and one nine pin connector, J11. Any monitor voltages to be measured may be done between the chassis ground and the required pin.

The pins are numbered as follows:

Table 13 - 7100M Alarm Connector (J9) Pinouts

Pin No.	Function	Name	Slot No.
1	RF Alarm	RFA1	1
2	RF Alarm	RFA2	2
3	RF Alarm	RFA3	3
4	RF Alarm	RFA4	4
5	RF Alarm	RFA5	5
6	RF Alarm	RFA6	6
7			
8			
9			
10			
11			
12			
13			
14	Optical Alarm	OPTA1	1
15	Optical Alarm	OPTA2	2
16	Optical Alarm	OPTA3	3
17	Optical Alarm	OPTA4	4
18	Optical Alarm	OPTA5	5
19	Optical Alarm	OPTA6	6
20			
21	Standby Power Supply Alarm NOP	SPSA	
22	Standby Power Supply Alarm COM	SPSCOM	
23	Main Power Supply NOP	MPSA	
24	Main Power Supply COM	MPSCOM	
25	Chassis Ground	GND	

Table 14 - 7100M Monitor Connector (J10) Pinout

Pin No.	Function	Name	Slot No.
1	RSSI Monitor	RSSI1	1
2	RSSI Monitor	RSSI2	2
3	RSSI Monitor	RSSI3	3
4	RSSI Monitor	RSSI4	4
5	RSSI Monitor	RSSI5	5
6	RSSI Monitor	RSSI6	6
7	PDI Monitor	PDI1	1
8	PDI Monitor	PDI2	2
9	PDI Monitor	PDI3	3
10	PDI Monitor	PDI4	4
11	PDI Monitor	PDI5	5
12	PDI Monitor	PDI6	6
13	LSRI Monitor	LSRI1	1
14	LSRI Monitor	LSRI2	2
15	LSRI Monitor	LSRI3	3
16	LSRI Monitor	LSRI4	4
17	LSRI Monitor	LSRI5	5
18	LSRI Monitor	LSRI6	6
19			
20			
21			
22			
23			
24			
25	Chassis Ground	GND	

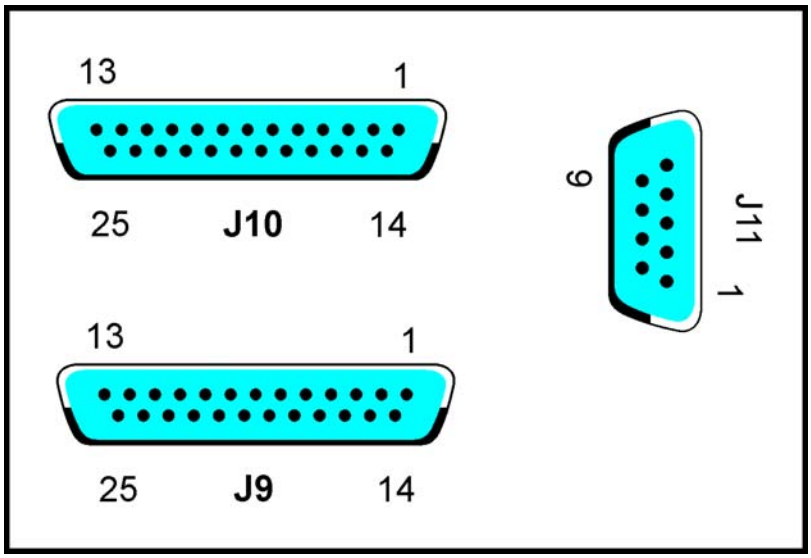


Figure 41 - 7100M Pin Numbers

7100M and Redundancy Switching

The 2000 Switch provides optional 1:1 redundancy switching for all Foxcom Interfacility Links. If the customer chooses to add redundancy switching to the link, the pin connector jumpers need to be moved. Detailed instructions on moving the jumpers are provided in the *Model 2000 1:1 Redundant Switch Installation and User's Guide (Document Number 93-010-01).*

10.6. The 2300 Relay Adaptor

The following section describes how to install the 2300 Relay Adaptor onto the 7100M Chassis. The 2300 Relay Adaptor assembly provides dry contact outputs as an option to the standard open collector signals available on the 7100M chassis backplane.

If the 2300 Relay Adaptor is ordered separately from the 7100M chassis, it must mounted by the user. The 2300 is easily mounted directly over the connectors on the 7100M backplane, as shown below.

10.6.1. Installing the 2300 - Parts Needed

- 2300 Relay Adapter
- Two pin guides
- Four one inch screws
- Screw driver

Installing the 2300 - Procedure

To mount to the 2300 Relay Adapter:

WARNING

DO NOT PERFORM THIS PROCEDURE BEFORE DISCONNECTING THE ELECTRICITY

1. Disconnect the electricity.
2. Make sure that you have all the needed equipment.
3. Install the pin guides.

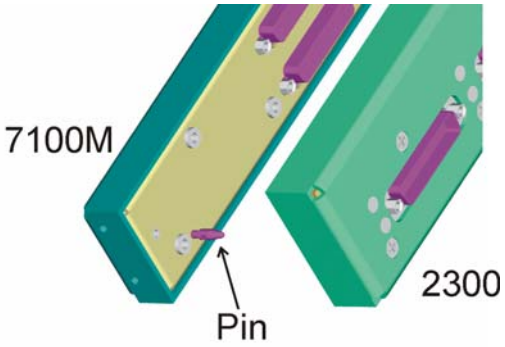


Figure 42 - Mounting the Chassis and Adaptor - Detail

4. Mount the unit onto the pin guides.

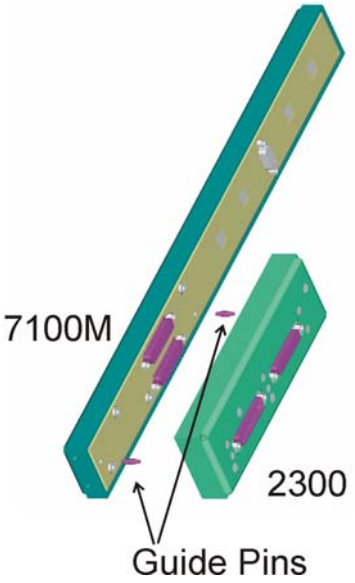


Figure 43 - Mounting the Pins and Adaptor

5. Mount the four screws. The screws must be installed in the order shown in Figure 44 and Figure 45.

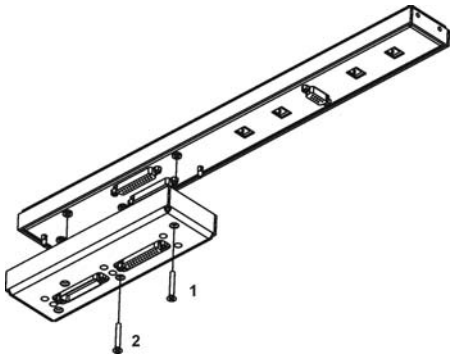


Figure 44 - Mounting the Screws (1)

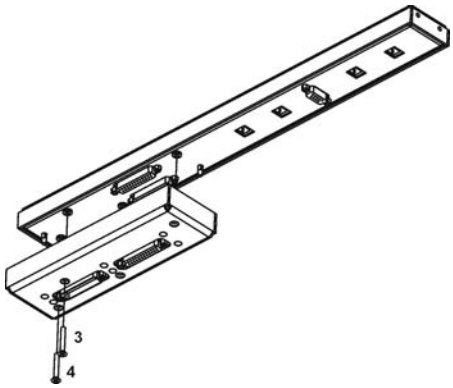


Figure 45 - Mounting the Screws (2)

CAUTION

Use only the mounting screws provided by Foxcom. Using other screws can permanently damage the unit!

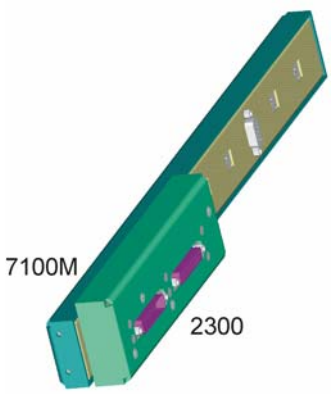


Figure 46 - Mounted 2300

6. Connect the cables.

10.6.2. 2300 Dimensions and Front Panel Label

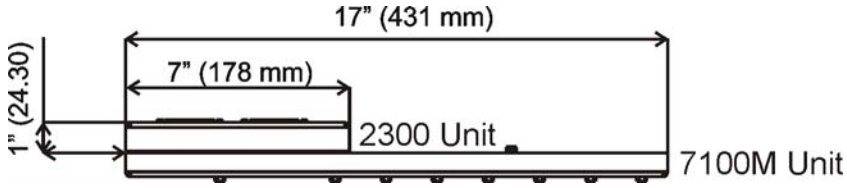


Figure 47 - 2300 Dimensions

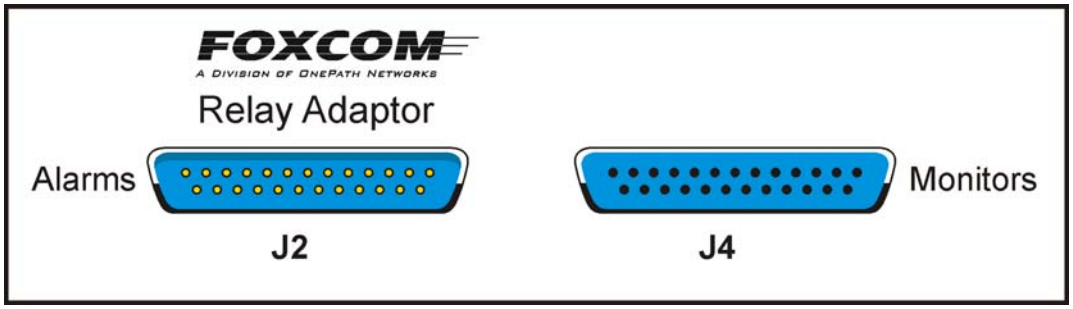


Figure 48 - 2300 Front Label

10.6.3. 2300 Pinouts

The following table details the 2300 Alarms pinouts.

Table 15 - 2300 Alarms Pinouts (J2)

Pin Number	Function	Name	Slot Number
1	Opt. Alarm	OPTA1	1
2	RF Alarm	RFA1	1
3	Common	COM1	1
4	Opt. Alarm	OPTA2	2
5	RF Alarm	RFA2	2
6	Common	COM2	2
7	Opt. Alarm	OPTA3	3
8	RF Alarm	RFA3	3
9	Common	COM3	3
10	Opt. Alarm	OPTA4	4
11	RF Alarm	RFA4	4
12	Common	COM4	4
13	Opt. Alarm	OPTA5	5
14	RF Alarm	RFA5	5
15	Common	COM5	5
16	Opt. Alarm	OPTA6	6
17	RF Alarm	RFA6	6
18	Common	COM6	6
19			
20			
21			
22			
23	Standby PS Alarm	SPSA	
24	Main PS Alarm	MPSA	
25	Power Supply Comm.	PSCOM	

Table 16 - 2300 Monitor Connector Pinout (J4)

Pin No.	Function	Name	Slot No.
1	RSSI Monitor	RSSI	1
2	RSSI Monitor	RSSI	2
3	RSSI Monitor	RSSI	3
4	RSSI Monitor	RSSI	4
5	RSSI Monitor	RSSI	5
6	RSSI Monitor	RSSI	6
7	PDI Monitor	PDI1	1
8	PDI Monitor	PDI2	2
9	PDI Monitor	PDI3	3
10	PDI Monitor	PDI4	4
11	PDI Monitor	PDI5	5
12	PDI Monitor	PDI6	6
13	LSRI Monitor	LSRI1	1
14	LSRI Monitor	LSRI2	2
15	LSRI Monitor	LSRI3	3
16	LSRI Monitor	LSRI4	4
17	LSRI Monitor	LSRI5	5
18	LSRI Monitor	LSRI6	6
19			
20			
21			
22			
23			
24			
25	Chassis Ground	GND	

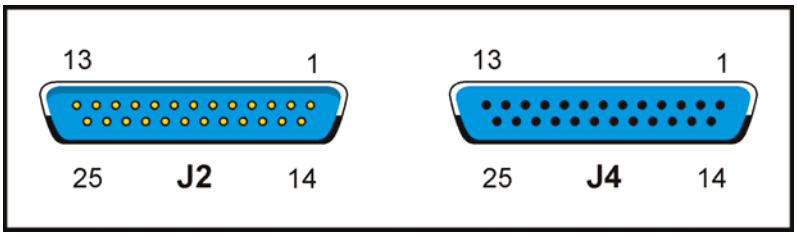


Figure 49 - 2300 Pin Numbers

10.7. Appendix IV Changing the Primary Power Setting

By default all Foxcom products are set operation at 230 VAC. To change to 115 VAC operation the instructions below must be followed to avoid damage to both personnel and equipment.

To change the mode:

1. Disconnect the AC power.
2. Unplug the power supply module from the chassis.
3. Place a small screwdriver under the Lip.
4. Gently press upwards; the Fuse Drawer will come out slightly.

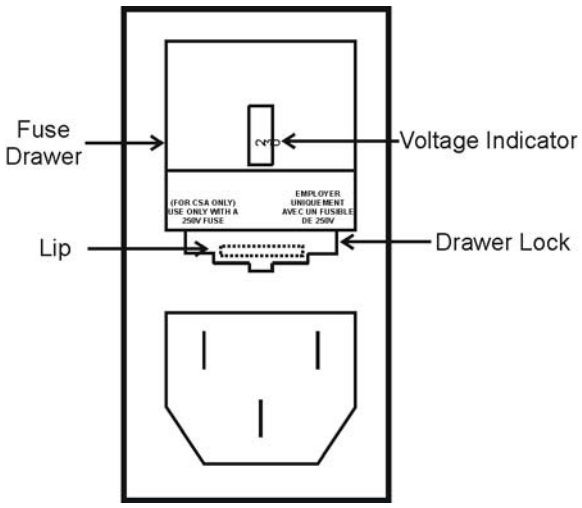


Figure 50 - Fuse Drawer

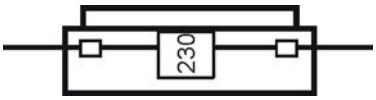


Figure 51 - Voltage Selector (230 Side)

5. Pull the Fuse Drawer out completely; the Voltage Selector is at the top of the compartment. The number on the Voltage Selector is 230.

6. Using the screwdriver, gently remove the Voltage Selector from the Connector.

7. Turn the Voltage Selector so that the number 115 facing outward.

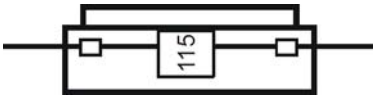


Figure 52 - Voltage Selector (115 Side)

8. Gently put the Voltage Selector back into the Connector. The Voltage Selector should snap in easily.

9. Remove the fuse from the fuse drawer, and insert the 1A/250V fuse.

10. Snap in the Fuse Drawer.

If you need to replace the fuse use the parts specified in the following table:

Table 17 - AC Voltage Fuse Part Numbers[23]

Voltage	Current	Littelfuse Part No.	Schurter Part No.
230	0.5 A	239.500	0034.3114
115	1.0 A	239.001	0034.3117

Both fuses are slow-blow 250 VAC rated.

Table 18 - DC Voltage Fuse Part Number[24]

Voltage	Current	Bussman Part No.	Schurter Part No.
220	5 A	S506 GDC-5	0034.3124

The fuse is slow-burn.

[23] or the equivalent

[24] or the equivalent

11. Appendix V Pinouts, Detailed Information

The following charts give detailed information regarding the chassis and 2000 Switch pinouts.

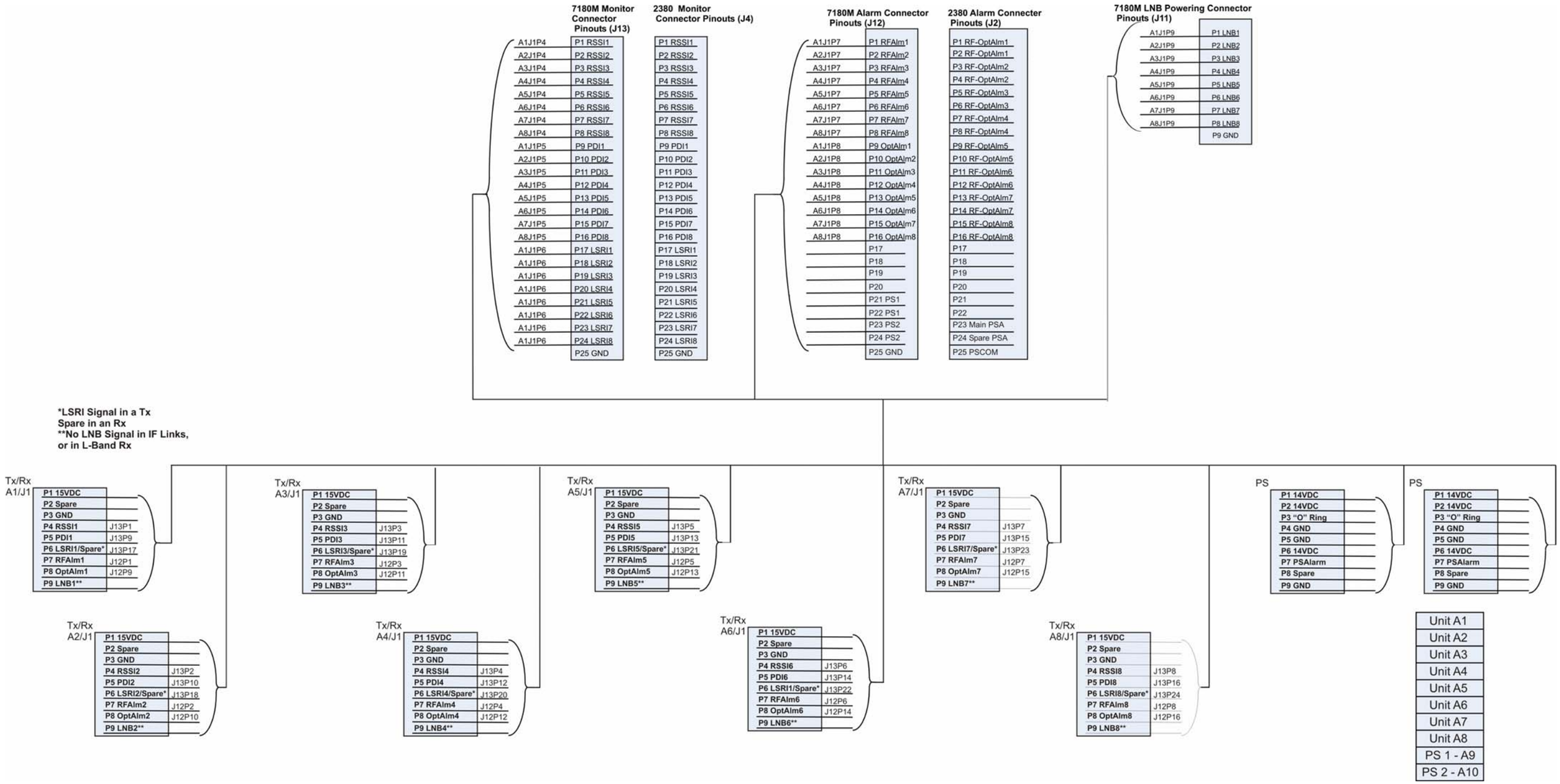


Figure 53 - Standard 7180M and 7180M with 2380 Relay Adaptor Pinout

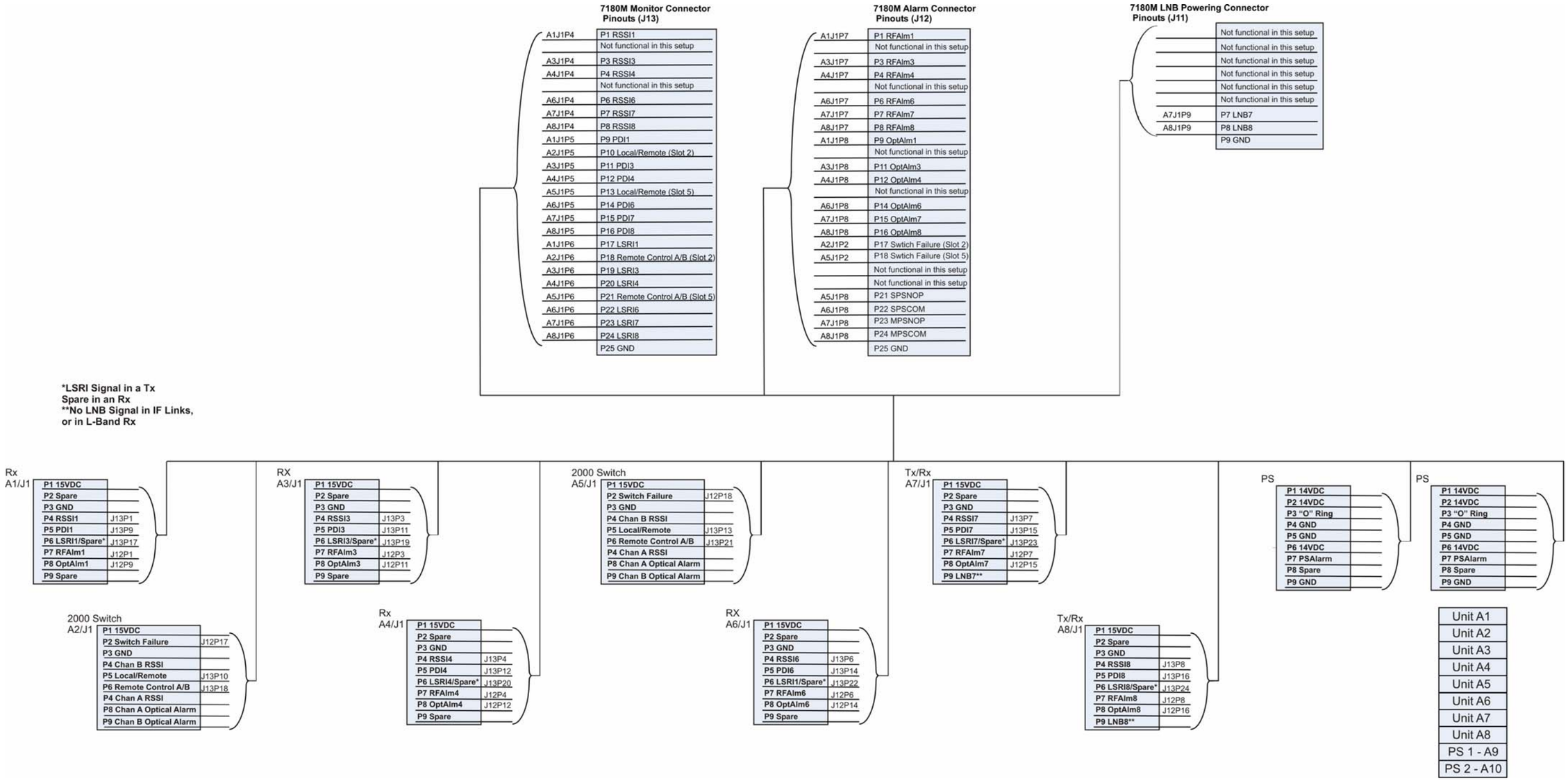


Figure 54 - 7180M with 2000 Switch Pinout

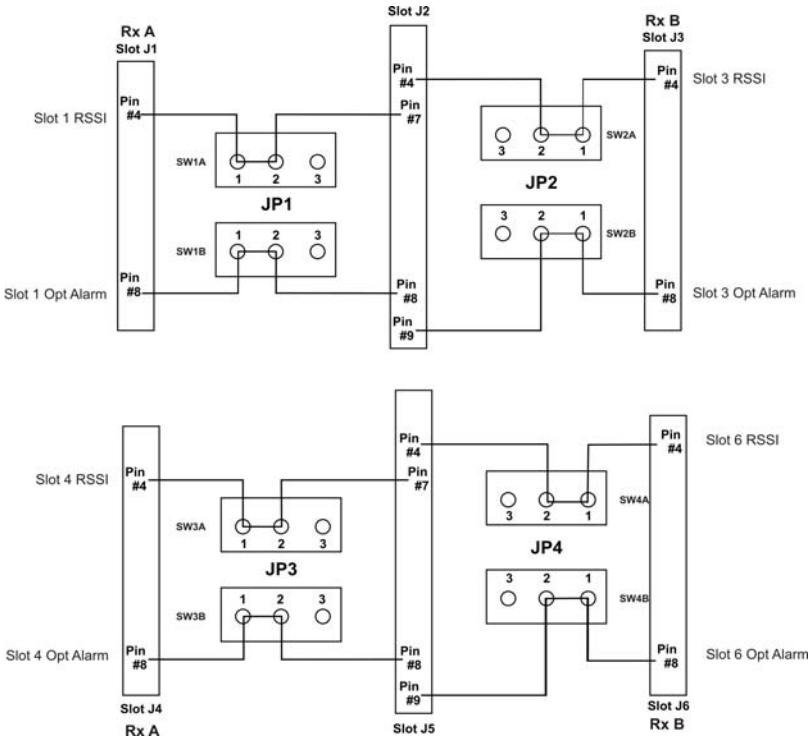


Figure 55 - Pinout of 7180M Jumper with 2000 Switch in Slot 2 and 5

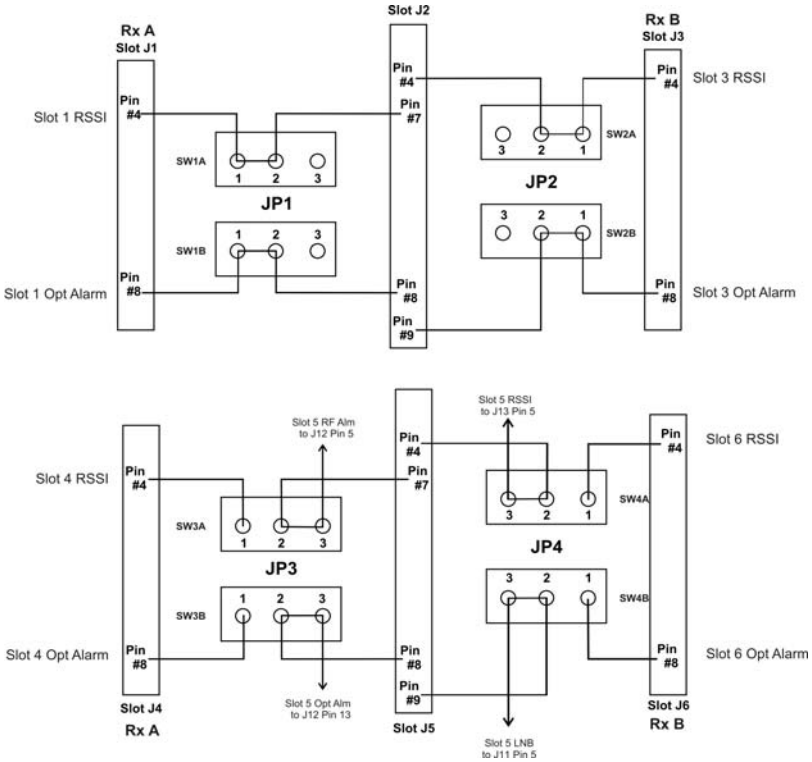


Figure 56 - Pinout of 7180M Jumper with 2000 Switch in Slot 2

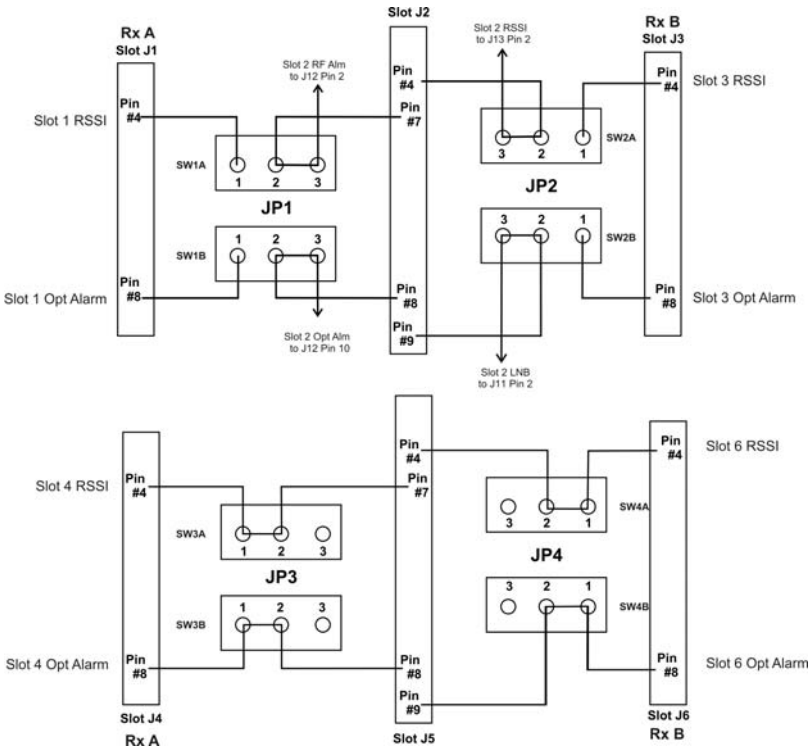


Figure 57 - Pinout of 7180M Jumper with 2000 Switch in Slot 5

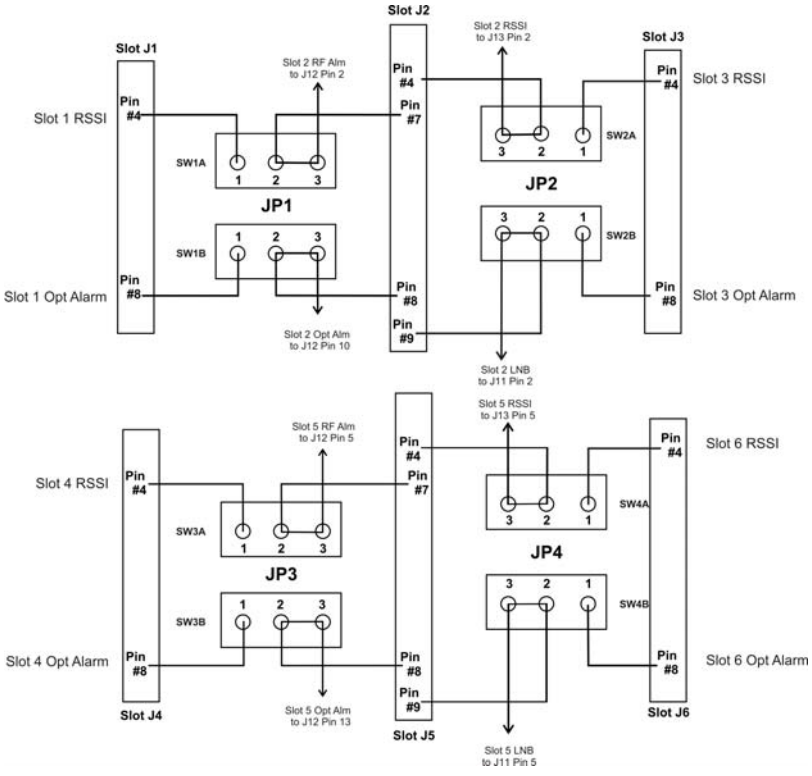


Figure 58 - Pinout of 7180M Jumper with Tx or Rx only